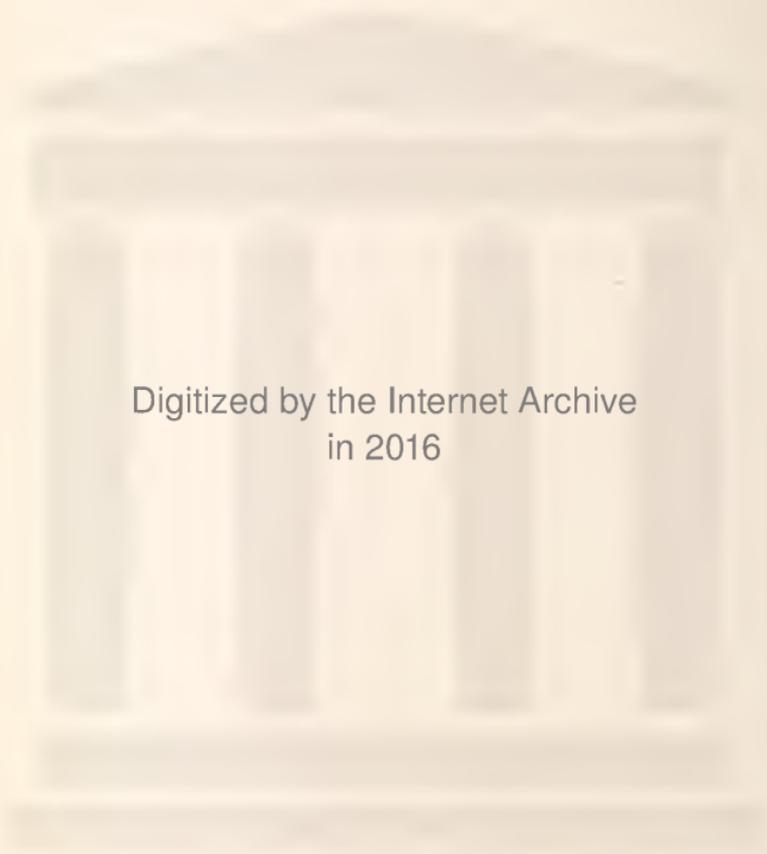


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JOURNAL
OF THE
ASIATIC SOCIETY
OF
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BENGAL.

EDITED BY
THE SECRETARY AND SUB-SECRETARY.

VOL. XII.
PART I.—JANUARY TO JUNE, 1843.
NEW SERIES.

"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of *Asia* will commit their observations to writing, and send them to the Asiatic Society, in Calcutta; it will languish, if such communications shall be long intermitted; and will die away if they shall entirely cease."—SIR WM. JONES.

CALCUTTA:
BISHOP'S COLLEGE PRESS.

1843.

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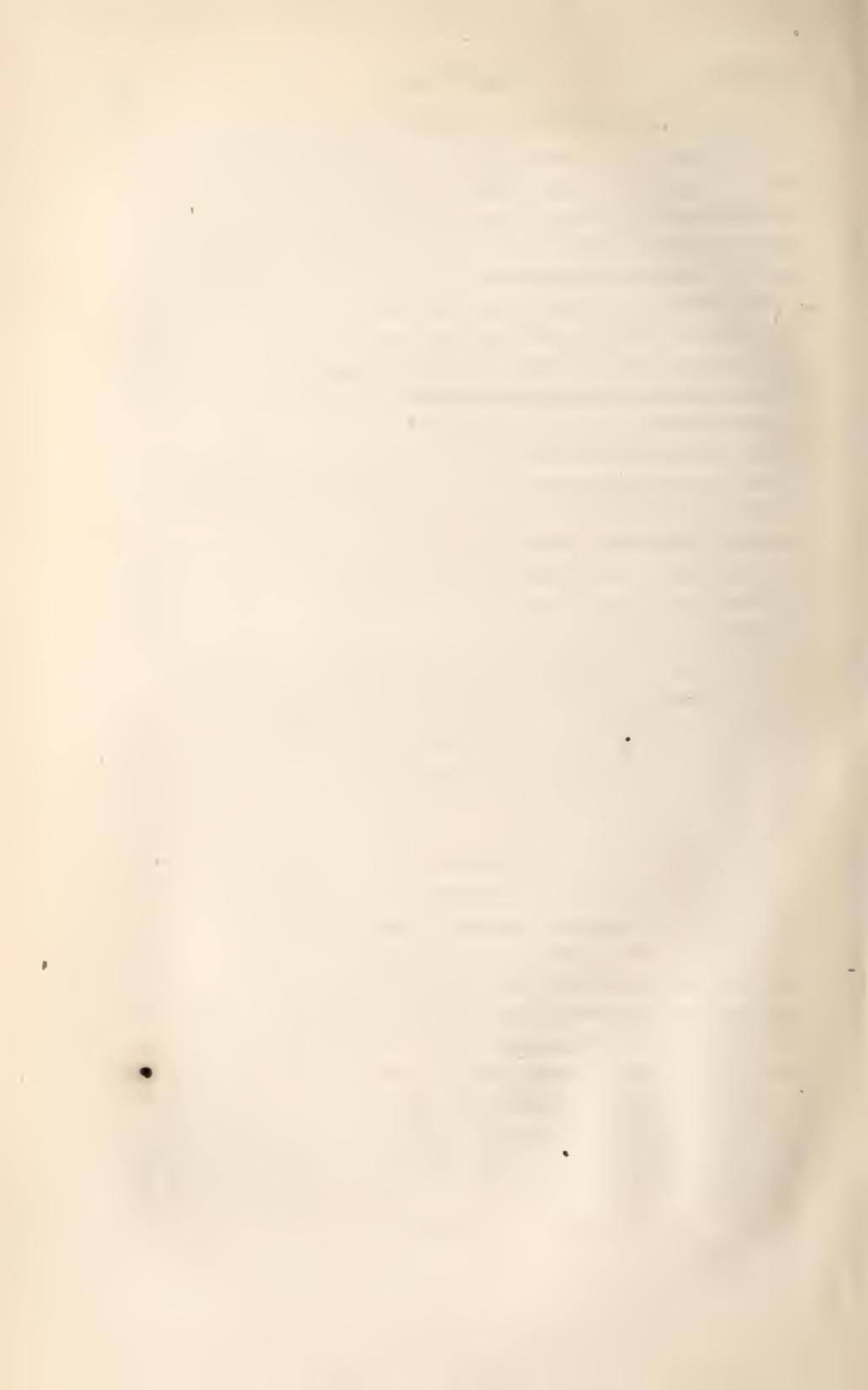
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JOURNAL
OF THE
ASIATIC SOCIETY.

AN EIGHTH *Memoir on the Law of Storms in India, being researches relative to the Storm in the Bay of Bengal, at Madras, and in the Arabian Sea, of 22d to 31st October, 1842, with two charts.*
By HENRY PIDDINGTON.

On the 24th October 1842, a severe hurricane was experienced at Madras and other ports on the Coromandel Coast, in which several ships were wrecked or foundered at sea, and much other damage was done. It is the object of the present memoir to trace out the track of this storm, which, there is no doubt, crossed the Peninsula, and is traceable from the Andaman Islands to latitude 14° N., longitude 60° E., or within 6 degrees of the Island of Socotra, an extent far exceeding that to which any Indian Storm has yet been tracked.

The principal sources of information which I have, are from the documents forwarded to me by Captain Biden, the Master Attendant of Madras, who has been most indefatigable in profiting by the advantages which his official position afforded him. It is, therefore, to his zeal in the cause of science, that we mainly owe this memoir; for what I could collect in Calcutta, was so meagre, that it would have been but of little avail in tracing the storm as we have now done.

From the Peninsula, I have reports from Captain Campbell, Revenue Surveyor South of India, Captain Newbold, M. N. I. Assist. Comr. Kurnool, Mr. Crozier, Collector at Malabar, M. Bourgoïn, Governor of Karical, and Mr. Buist in charge of the Observatory at Bombay. These gentlemen have been most indefatigable in their endeavours to procure

me all data within their reach, or that of their friends, and I am much indebted to them for their most ready assistance. I have as usual, noted with every document the sources from whence it was obtained.

I commence, as in my former Memoirs, by giving the documents, abbreviated as much as is consistent with clearness and accuracy of detail; and of these I have first chosen those farthest to the Eastward. I shall then give comparative tables, and lastly, a general summary and remarks, shewing upon what data, and according to what probabilities, when data do not exist, the tracks and storm circles of the charts are laid down. The general reader I trust, finds this part quite *readable*, and the mariner and man of science will be able to judge of the correctness of my inferences from the documents. I shall be greatly obliged by their remarks and corrections from any part of the world; and if at times I may seem to have registered too many details, it will be remembered that all details, and these given with fidelity, are the essential elements for the successful investigation of every complex physical problem, and most especially those relating to a new branch of meteorology.

Abridged Log of the Brig WATERLOO, Capt. Moore, reduced to civil time. Forwarded by Capt. Biden.

20th October.—At daylight strong breezes N. N. E. hazy weather, several water spouts to the South-west and N. E., with a heavy swell from the N. E. Little Andaman at noon N. E. Latitude $10^{\circ} 16' N.$, longitude Chron. $92^{\circ} 23' E.$ P. M. Winds N. N. E. to N. E. to midnight. Sunset squally. Midnight strong squalls

21st October.—Daylight fresh breezes, to noon, when Lat. $11^{\circ} 52' N.$, longitude Chron. $91^{\circ} 16'.$ P. M. fresh breezes N. N. E. increasing to midnight.

22d October.—1 A. M. fresh gales N. N. E., daylight increasing, down top gallant yards and masts, and prepared for bad weather. 8 A. M. heavy gales N. E. with squalls and rain, heavy sea running, and vessel labouring much. Latitude $13^{\circ} 27' N.$, longitude Chron. $90^{\circ} 03' E.$ 1 P. M. heavy gales, squalls, rain, and sea to midnight.

23d October.—Midnight wind East, more moderate. At daylight more so, all sail set by noon, when Latitude $14^{\circ} 45' N.$, longitude

Chron. $28^{\circ} 55'$ E. The wind South, S. E. and S. S. E. squally and variable to midnight.

24th October.—Midnight to noon, fresh breeze and cloudy. Noon, Latitude $14^{\circ} 44'$ N., longitude $86^{\circ} 38'$ E.

Abridged Log of the Ship LADY FEVERSHAM from Calcutta to Bombay, reduced to civil time. From Capt. Biden.

22d October.—At noon, by log worked back from 24th, lat. $12^{\circ} 45'$ $\frac{1}{2}$ N. long. $86^{\circ} 5'$ E. P. M. increasing winds with a squally appearance, N. and N. by W. to midnight. At 11, blowing a gale, midnight wind increasing with lightning, furling the foresail, from noon to midnight had run 80 miles S. by E. and S., and 7 miles more to 1 A. M. of the 23d, placing the ship at midnight in lat. $11^{\circ} 26\frac{1}{2}'$, long. $86^{\circ} 22'$ E.

23d October,—At 1 A. M. finding it impossible to run the ship longer, clued up the main top sail. At 1h. 30m. blowing a complete hurricane, when the ship broached to the wind. Bar. at 2 P. M. of 22d, 29.70. At 11 P. M. 29.40. and at 1 A. M. of 23rd 28.40. At 1h. 45m. P. M. blowing a dreadful hurricane at N.; the main and mizen masts fell over on the starboard side, carrying with them the fore top mast; cut away the wreck as quick as possible, and cleared the mast from the ship's sides. At 2h. 45m. the wind suddenly lulled, when the ship fell off and rolled in a most dreadful manner; a sea struck her abaft, which stove in four of the upper stern windows, washing away all the bulk heads in the cuddy, luggage, medicine chest, and every possible thing, however well secured. At 3, the wind shifted to the South and blew furiously, so that no one could stand on deck; lost quarter boats, hen coops, binnacles, bulwarks, and sails fore and aft, the long boat nearly filled, and all the stock drowned. At 3h. 30m., the hurricane at its greatest force. Bar. at 28.30. At 5h. commenced to abate, mustered all hands and found the chief mate and one seaman seriously injured, sounded the pumps at three feet and six inches, turned to and pumped her out. The main yard having fallen through the deck on the starboard side, was the cause of so much water being in the ship, boused it up and secured the hole, cleared and cut away the remainder of the wreck; still a heavy sea, but wind gradually abating. At noon strong winds at E. S. E. with heavy squalls and rain, all hands employed getting prepared to make some sail. At noon lat. observed $12^{\circ} 4'$ N. P. M. strong winds

and squally with less sea, all hands employed clearing away. At sunset pumped ship at two feet, squared the fore yard, and made all clear for getting some sail up. Midnight moderate winds at E. S. E., ship's head from N. N. E. to N. E.

24th October.—Day-light bent the fore sail, and fore top mast stay sail, set them, the mizen gaff towing astern got it in, and rigged it for a fore try sail. Noon moderate weather, with occasional squalls of rain. Lat. observed $13^{\circ} 16'$ N. long. by Chron. $86^{\circ} 85'$ E. Course made from Saturday at noon N. 16° W. 32 miles.

The following abstract of the Log of the Ship WHITBY, alluded to by Capt. Biden, was subsequently forwarded to me by that gentleman, but unfortunately the place of the vessel is nowhere noted. Captain Biden thinks, she must have been about 30 leagues to the Eastward of the LONDON, but how far South we are ignorant. I have thus not marked her position on the chart. It is possible that the Brig alluded to was the ANN METCALFE, though in her Log the loss of the fore topmast is not alluded to, and a note indorsed on the extract says only, that she had "SPRUNG a topmast, and put in to refit." I suppose "lost" may have been intended. With the ANN METCALFE also, the shift takes place at noon, and with the WHITBY at about 9 A. M. though in such weather the time is seldom exactly noted.

On the afternoon of the 22d October, the weather was hazy, with moderate breeze at N. N. E. The appearance to windward was such as North country seamen call "greasy." The Barometer fell in the course of the day from 30.10 to 29.90, the breeze increased during the night with occasional showers, and veered to N. N. W. At midnight, the Barometer 29.78. About 3 A. M. 23d, the storm commenced at N. N. W., increasing until 7 A. M., when it blew a perfect hurricane, veering to N. N. E. and N. E. with lightning; the Bar. now fell rapidly, and at 8 A. M. stood at 28.45, having fallen 1.65 in 20 hours. At 9 A. M. after a most violent gust at E. N. E. it suddenly fell a dead calm. *A Brig was then in sight without a fore topmast.** A large number of birds of the Petrel genus alighted on board, and

* Possibly the *Ann Metcalfe*, as above.

took shelter in the boats and under hencoops. At 10-30, the wind sprung up suddenly from S. W., veered to South, and 11-30 to S. E., and again blew with increased violence, accompanied with rain; the Bar. rising slowly. At 1 P. M. the Bar. rose rapidly, the storm gradually abated with heavy rain, and at 6 P. M. settled down to an ordinary gale, at which time the Bar. was 29.86. Throughout the night, the wind gradually abated, and at sunrise brought fine weather, with a steady breeze at S. E. which continued throughout the day. The Bar. rising to 30.15.

This short account will enable you to compare the time and direction of the storm as it occurred at Madras, and I hope to add to the facts necessary to elucidate the theory of storms. It appears to me, that from the sudden changes and extreme violence of the wind, I must have been near its vortex at the time whence it gyrated towards your coast, as it certainly did not extend any distance to the Eastward. I have only further to add, that although I have twice encountered hurricanes in the West Indies, I do not think they surpassed the late storm in violence when at its height.

I sustained but little damage in my spars, but lost most of my sails, also a seaman, and one of my boats, which last was blown completely over the poop from the davits.

WM. LACY *Whitby*.

NOTE.—Subsequent to closing my letter, I find on reference to my Journal, that the Barometer fell to 27.45. at 8 A. M. October 23, which makes the fall of mercury 2 inches and 65-hundreths, a change I have rarely experienced even in high latitudes, in so short a period. This fact is further corroborated by the account of Surgeon Tait, who at my request took note of the changes.

The following letter I received when this Memoir was nearly ready for the press, giving an account of the foundering of the Ship WASHINGTON, Capt. Barnes, in consequence of injury sustained in the Storm. I am indebted for it to Messrs. GLASS and Co. of Calcutta.

(Copy.)

Messrs. Glass and Co.

On board Sir Robert Peel.

GENTLEMEN,—I deeply regret to have to inform you, that the *Washington* foundered in the Bay of Bengal on the 25th October, in long,

86° 14' E. lat. 13° 29' N. from the effects of a dreadful hurricane on the 22d from the Eastward, in which she was dismasted. We were received on board the *Sir Robert Peel* of Aberdeen, David Craig, Master, from Calcutta, bound to London, on the 25th, but six of the crew were received on board the *Lord Glenelg* on the 1st November. About one-half of the sugar was pumped up before we left her, and the rest all damaged, as well as the hides and turmeric. We had only time to save part of the stores and clothes. I lost the most of mine, and what was saved, are damaged with salt water. Although we saw next morning after the disaster, a vessel of 6 or 700 tons with only the fore-mast standing, I do not think it was of great extent, at least in a Northerly direction, as the *Robert Peel* had fine weather on the 22d, with a heavy swell, by which she carried away her fore-top-mast and main topgallant-mast; at the time she was distant in a Northerly direction about 180 miles from us. Had the *Washington* continued tight, we might have got in with the land about Madras, the nearest port; but as every one had to take his share of pumping by day and night to keep her from sinking, none could be spared to rig jury-masts, and get the sails bent; in fact every one was almost worn out before we got on board the *Sir Robert Peel*.

I close this to say, that we arrived here yesterday, and sail to-day, and hoping this will find you well.

St. Helena, Jan. 4, 1842.

D. BARNES.

Log of the Brig ANN METCALFE, J. Errington, Commander, reduced to civil time. Forwarded by Capt. Biden.

22d October.—Saturday, noon, commences with moderate breeze from the N. E. with thick hazy weather, and occasional showers of rain. Barometer 29.70. At 4 P. M. increasing breeze with continued small rain. Barometer 29.60. At 8 P. M. wind still increasing, with a strong sea from the Northward. Barometer 29.40. Midnight very thick with constant rain, both wind and sea increasing fast from the Northward. Barometer 29.20. Thermometer 75°.

23d October.—Sunday, at 4 A. M. wind increased to a gale from the Northward, with a tremendous sea; at 8 A. M. it blew a complete hurricane from the Northward, the sea running very high. Bar. 28.70.

Noon, wind lulled for the space of half an hour, and shifted to the South, and blew a hurricane from that quarter also, which caused the sea to run up in the shape of a cone, making it very dangerous for a ship to live in. Lat. account $12^{\circ} 0'$ North, longitude $85^{\circ} 30'$ East. At 4 P. M. wind still at South, with a tremendous heavy sea, ship laying to, under bare poles, as no canvas would stand to it. Barometer 28.50. At 8 P. M. a little more moderate, but sea still very high. Barometer upon the rise 28.80.

Midnight cloudy, but more moderate, and sea falling; made sail to trysail and foresail. Barometer still rising and 29.00.

24th October.—Monday at 4 A. M. wind from the S. S. E. still moderating, and sea going down. Barometer 29.20.

At 8 A. M. wind still from the S. S. E. and moderating fast, sky beginning to break through the clouds. Barometer 29.50.

Noon, moderate and fine, clear sky, with sea decreasing, wind at S. E. latitude observed $12^{\circ} 6'$ N. longitude Chron. $84^{\circ} 30'$ E.; ship arrived at Madras on the 29th October:

JOHN ERRINGTON,

Commander.

Abridged Log of the Ship LONDON, from Madras to Moulmein, reduced to civil time. Forwarded by Capt. Biden

22d October.—P. M. to midnight, fresh breeze from N. E., and increasing with squalls. Ship standing to the E. S. E. about 22 miles in the 12 hours. Bar. 29.75.

23d October.—A. M. strong breeze N. E. increasing with squalls, and heavy head sea. At 6, wind N. N. E. At 8, increasing gale with heavy gusts, close reefed topsails. Bar. 29.80. Ther. 81° . Noon, strong gale, frequent violent squalls and heavy sea. Bar. 29.70. Lat. by account $12^{\circ} 56'$ N. long. $83^{\circ} 55'$ E. P. M. wind N. E. increasing; frequent heavy squalls, lying to with head to the S. E. 4 P. M. Bar. 29.70. 8 P. M. wind E. N. E. Midnight heavy gale with frequent violent squalls.

24th October.—1 A. M. Bar. 29.50. At 2, wind marked S. E. with the same. At 6, wore to the N. E. Noon Bar. 29.70. to 29.50.*

* So in the MSS. I do not find it mentioned that there were two, and the Bar. cannot I think have varied so much in the squalls. I suppose the meaning to be, that between midnight and noon the Bar. had risen from 29.50. to 29.70.

Ther. 81° ; fresh gales, but made some sail. Lat. by indifferent observation $12^{\circ} 34'$ N. long. $83^{\circ} 44'$ E. P. M. wind E. S. E. strong breeze. At 8 P. M. more moderate. Midnight fine. Bar. 29.50.

25th October.—Fine wind S. E. Lat. $13^{\circ} 20'$ N. long. $84^{\circ} 70'$ E. Bar. 30.05. Ther. 82° or 84° .

Abridged Log of the Barque SARAH, Capt. Walker, reduced to civil time. Forwarded by Capt. Biden.

The *Sarah* by her log worked back from noon of the 24th, appears to have been at noon 22d October in about lat. $14^{\circ} 52'$ N. long. $83^{\circ} 24'$ E. At 1 P. M. of which day a steady breeze from N. E. sprung up, increasing to a fresh breeze with cloudy weather, and a heavy sea at midnight; wind N. E.

23d October.—Daylight increasing N. E. wind, with a turbulent sea. Noon, Bar. 29.73. Lat. account $14^{\circ} 07'$, long. account $84^{\circ} 24'$ E. Squalls increasing in rapidity and violence, till a little after noon she hove to. P. M. wind N. N. E., blowing a gale. 6 P. M. N. E. tremendous sea, vessel laboring greatly.

Barometer as follows; viz.

1 P. M.	29.70
2 „	29.65
3 „	29.62
4 „	29.56
6 „	29.60.

24th October.—A. M. wind veering from N. E. by E. to East. At 4 P. M. Bar. 29.63. At 7, 29.68. At 8, 29.73. At 8 A. M. moderated a little, and veered to E. by S. wore and scudded; wind East. Noon strong gales E. by S. Lat. observed $13^{\circ} 34'$ N. long. observed $83^{\circ} 53'$ East. At 2 A. M. passed a large ship, which had lost all her topmasts.

Abridged Log of the Barque STALKART, Capt. A. R. Dixon, from Colombo to Madras.

22d October.—At noon in lat. $12^{\circ} 10'$ N., long. account $80^{\circ} 33'$ E.* Fresh breeze N. by E. and cloudy, *high sea from the N. E.* At 4 P. M.

* This longitude and those of the 23d and 24th are obtained by working back the log from the 25th, on which day only the longitude is given.

and in the evening threatening, made preparations for bad weather, wind marked N. E. At 3 P. M. wind "variable" to midnight, though the course is constantly E. by S. ; midnight fine.

23d October.—2-30 hard squall ; 3, sea increasing ; lat. by Rigel in Orion $12^{\circ} 03'$ N. ; by 5 A. M. hard gales N. N. E. 7-10, very threatening weather, secured every thing. Noon squally, and high turbulent sea, sun obscured. Lat. by account $11^{\circ} 33'$ N. long. account $80^{\circ} 58'$. The wind Northerly, hard gales, every appearance of a hurricane. By 10 P. M. blowing a hurricane from N. N. W., sea rising in pyramids.

24th October.—4 A. M. wind veered to the Westward. At 6, marked West, blowing with great violence, sea making a clear breach over all, hove to with a tarpaulin in the mizen rigging. 10 A. M. wind W. S. W. Noon more moderate, sea not quite so agitated, thick and cloudy. No observation. Lat. by account $11^{\circ} 33'$, long. $81^{\circ} 31'$ E. P. M. strong gales South, squally unsettled weather. At 6, more moderate. At midnight pleasant breeze.

25th October.—4 A. M. lat. by moon and Sirius $12^{\circ} 13'$ North. At noon lat. $12^{\circ} 46'$ N. long. $80^{\circ} 55'$ E.

Abridged Log of the Bark FAVORITE, Capt. W. F. Wilkins, from Madras to Vizagapatam, reduced to civil time. Forwarded by Capt. Biden.

22d October.—Lat. at noon $12^{\circ} 12'$ N. long. $81^{\circ} 40'$ E. wind N. E. to 6 P. M. and N. by E. to midnight, squally at times with dark threatening weather.

23d October.—2 A. M. wind N. N. E. ; day-light to noon increasing to strong gales with dark threatening weather and every appearance of an increasing gale, for which all preparation was made ; wind from 8 A. M. to noon marked N. E. by N. No observation. Lat. account $11^{\circ} 49'$ long. account $83^{\circ} 35'$. 8h. strong gales N. by E. At 6 P. M. very heavy, a man washed overboard from the poop, hove to with head to the Eastward. At 10-15, vessel laid on her beam ends with the top-rims in the water, cut away the lower masts, and righted her with 4 feet water in the hold, ballast and cargo shifted, and deck torn up by the fall of the masts, pumps choked, and rudder gone.

24th October.—Day-light still blowing heavily from the S. E. (the wind is marked N. by E. at 1 P. M. of 23d, but afterwards, though the time of change is not marked, it is stated to be at S. S. E.) noon more moderate. No observation. Lat. account $11^{\circ} 53'$ long. $83^{\circ} 35'$ E. 7 P. M. wind S. E. by S. At 10, moderating.

25th October.—Employed making a temporary rudder. This log ends somewhat abruptly, it being only stated that both Chronometers were ruined by salt water. I presume that the other instruments were also rendered useless, and thus no observed latitude or run is given. The positions are thus estimated from the Lat. and Long. given on the 22d, and the subsequent logs.

The LORD ELPHINSTONE.

The *Lord Elphinstone* which left this port on the 16th ultimo for Coringa, encountered a severe gale of wind on the 23d and 24th, in latitude $15^{\circ} 37'$ North and longitude $81^{\circ} 30'$ East, with a heavy sea running the whole time. The Barometer fell to 29.69, which is as low as it fell at this presidency (Madras.) The wind blew from N. N. W.* to East, at which quarter it terminated at 4 A. M. on the 25th. The good ship bore the gale well, having lost neither mast, spar, nor sail. She has since arrived at her destination.—*Madras Paper*.

The foregoing are the Logs of Vessels at sea in the Bay of Bengal. I now give the information from Madras and the Coast, and then the Logs of the Vessels which put to sea from the Roads. The following is an extract of a letter from Capt. Biden:—

Madras, January 3, 1843.

MY DEAR PIDDINGTON,—I had the pleasure to forward you by the *Enterprize* on the 28th ultimo, all the logs which I have collected since our gale of October 24th. I have been so much engaged, that I was prevented sending them sooner as I intended, and having so long delayed the transmission of these valuable records, I would not forego so favorable an opportunity as this per *Hindustan*. One advantage has been gained by the delay; viz. the possession of the *London's*

* NNE. is probably meant here.—H. P.

and the *Sarah's* log Capt. Atwood of the *London*, encountered the gale on his passage from this port to Moulmein, and the *Whitby*, which vessel sailed hence with troops for Moulmein on the 16th of October, (the *London* sailed on the 18th,) experienced a perfect hurricane; her sails were blown to shreds, and she lost her quarter boat, bulwarks, and one man washed over board. The commander of the *Whitby* told Captain Atwood, that the wind flew round to the Southward, that his Barometer fell down to 28, and that his vessel was for sometime in a critical situation. He promised to send me a copy of his log, otherwise Capt. Atwood would have obtained minute information; but I am sorry to say, the *Whitby's* log has not reached me. I believe the *Whitby* was about 20 or 30 leagues east of the *London*. As she sailed two days before her, the description of weather the *Whitby* encountered, and her disasters, tally very much with what was experienced by the *Lady Feversham*, and I believe she was not far from the *Feversham* during the gale. I hope the information I have been enabled to gather together, will furnish you with such authentic statements of the extent, duration, and the character of the remarkable storm to which all the logs relate, as can well be collected. I am of opinion that Pondichery was the central position by land,* as it blew a complete hurricane there, and was by no means so violent at Negapatam. The log of the *Lady Clifford* details the weather at that southernmost point, and to the Westward of Madras there was no indication of a severe gale. Official and private reports forwarded with the logs shew, that the Barometer did not descend below 29.70, and a rise was visible about 4 P. M. The gale commenced here about 8 A. M. on the 24th, and then the Barometer was at 29.89. We had smart squalls the preceding night, and much rain, and except at intervals from 6 A. M. till about noon, the weather was thick and hazy, with much rain, however, only two vessels remained in the roads after eleven. The *Dauntless* slipped at noon, and the *Emerald* brig, having got down her yards, and riding heavily, cut away her masts at 3 P. M., the sea then making a fair breach over her, with two anchors ahead, from one of which she parted; she rode out the gale. It blew fresh, and at times in hard gusts. The wind was from North to N. by E. till noon, N. N. E. at 2 P. M. and veering from N. N. E. to E. N. E. till 6.

* The centre passed a little to the north of Pondichery.

At 4-30, the Barometer indicated a rise, when the wind shifted to E. by S. and E. S. E. At 7, the Barometer had risen nearly one-tenth. At 8, it was at 29.84, the wind then S. E. and at 10, the weather cleared up, the moon rose about 10-30, and from that time till midnight we had moderate breezes from S. E. to S. S. E. and fair weather. I kept an anxious look-out on the *Emerald*, saw a light on board of her occasionally, and at 1 A. M. being well satisfied that she was safe, I left my office. You will observe by the logs of the respective vessels which slipped from the roads, how critically several of them were situated; for instance, the *Repulse*, *General Kyd*, and the *Amelia Mulholland*. I attribute their perilous situation to the want of due attention to those precautions which are laid down in clause 10 of our revised Port Regulations, copy of which I forward you.

The vessels named in the margin,* were wrecked between Covelong and the Seven Pagodas. The Barque *Highlander* lost her rudder, the *Arethusa* and *Ganges* were too light, and were thrown on their beam ends, and it may be said, they literally drove on shore; but I am of opinion that the ship *Frances Smith* might have gained a sufficient offing to insure her safety if sail had been set and carried when she stood to sea; but unfortunately her courses were not bent, which might have been reefed, and carried the whole of the gale, whereas she split her fore topsail about noon, and under a treble reefed main topsail and a trysail, she was little better than lying to, and drifted fast to the Southward. The first cast of the lead at 7 or $\frac{1}{2}$ past 7, shewed the imminent danger of her position, and the accompanying deposition of an able seaman, who was one amongst the number saved from this unfortunate vessel, will shew what followed.

(Signed) C. BIDEN.

The following are the official communications from the Observatory, forwarded by Capt. Biden.

24th October.—At 8 A. M. Bar. Wind N. N. W.
 „ 10 „ N. by W.
 „ Noon 29.78. N. to N. by E.
 „ 2 P. M. 29.72. N. N. E.

* *Frances Smith, Highlander, Ganges, Ten, and Arethusa.*

24th October.—	6	P. M.	..	..	N. E.
„	7	Blowing hard,	..	E. N. E.	
„	8	„	..	E.	
„	9	29.84.	..	E. S. E.	
„	10	„	..	S. E.	/

Observatory, 24th October, 2 P. M.

The Acting Astronomer has the honor to forward to the Master Attendant, the register of the Barometer at this office, in continuation from noon of this day to the present time. He would state for the further information of the Master Attendant, that the Sympiesometer has commenced falling rapidly, and that every indication announces an approaching gale.

	H. M.				
Barometer at	0 30	..	..	.	29.7825.
„	1 0	..	..	....	29.7565.
„	1 30	..	..	..	29.7530.
„	2 0	..	..	....	29.7260.

Observatory, 24th October, 1842.

MY DEAR SIR,—I am happy to tell you, that the Barometer is steadily rising and Sympiesometer also. We have nothing to fear this evening. I think we must look out to-morrow. Barometer at this moment 29.8495.

Yours, &c.

(Signed) HENRY TAYLOR

The Acting Astronomer has the honor to inform the Master Attendant, that the Barometer has had a decided tendency to rise from 4 o'clock this afternoon; the results are in continuation from the last report.

Meteorological Journal, from 2 P. M. to 9.

1842.	Time.	Barometer.	Wind.
24th October.—	2 0 P. M.	.. 29.7260 ..	N. E.
„	2 30 „	.. 7105 ..	N. N. E.
„	3 0 „	.. 7100 ..	N. N. E.
„	3 30 „	.. 7230 ..	N. E.

24th October.—	4 0	„	..	29·7045	..	N. E. by E.
	4 30	„	..	·7185	..	E. N. E.
	5 0	„	.	·7390	..	E. S. E.
	5 30	„	..	·7565	..	E. by S.
	6 0	„	..	·7565	..	E. by S.
	6 30	„	..	·7760	..	S. E.
	7 0	„	..	·7995	..	S. E.
	7 30	„	..	·8225	..	S. E.
	8 0	„	..	·8400	..	S. E.
	8 30	„	..	·8495	..	S. E.
	9 0	„	..	·8525	..	S. E.

The late results shew a tendency to continued rising in the Barometer, the Sympiesometer is also rising, so that in all probability the worst of the gale has appeared for this night; at all events upon Col. Reid's Theory, the return of the gale may be felt before to-morrow.* The Acting Astronomer has made arrangements for a register to be kept throughout the night.

—————

*Abridged Report of Logs of vessels in Madras Roads, forwarded by
Capt. Biden.*

Brig COLUMBINE, Capt. Crisp, Madras Roads.

24th October, 1842.—P. M. strong gales, and a heavy sea running from the N. E., by midnight heavy squalls with rain. Wind N. E. At 4 A. M. ditto weather. At 7 A. M. close reefed the top sails, and double reefed the main trysail, and cleared the decks for sea. At 8 A. M. ditto weather. At 9-30 A. M. tremendous heavy squalls with rain, and having every appearance of a gale, slipped the chain at the 75th fathom shackle, and stood out to sea under the close reefed topsails and fore-top-mast staysail; most of the other vessels in the roads having slipped likewise. Wind N. E. At noon ditto weather with a heavy sea, the ship labouring much, and shipping a quantity of water on deck.

P. M. Commences with hard gales, and a heavy sea with tremendous squalls. At 2 P. M. wind E. N. E. At 4 P. M. wind East. At 8-30 P. M. the wind having gradually veered round to the

* So in MSS.

S. E. wore ship to the N. E. in 18 fathoms water, saw a blue light burning to the S. W. Midnight more moderate.

25th October.—At 4 A. M. made some sail, and stood in for the land. Noon light winds and passing showers. Latitude observations $12^{\circ} 37'$ North; after this time fine weather.

Report of the Barque SYMMETRY, Capt. F. D. Butler.

24th October.—At 9 A. M. blowing a heavy gale at N. by W., I slipped from my anchor and steered an East course until 2 P. M. wind continuing at North, and N. N. W. At 3 P. M. the wind shifted to N. E. blowing at times a perfect hurricane, altered course to S. E. A high sea running, ship laboring much. At 5 P. M. the wind in a heavy gust came from the East, and continued its violence, until 6-15 P. M., when it gradually abated, and drew to the S. E., continued on the starboard tack until 7-30 P. M. Wore ship then in sixteen and a half fathoms of water, and made more sail, rain descending in torrents. At 9 P. M. the wind veering more Southwardly, stood East until 6 A. M. then fine weather. Longitude by Chronometer $62^{\circ} 42'$ E. latitude $12^{\circ} 42'$. Wind South, experiencing a current of $3\frac{1}{2}$ to 4 mile per hour to the Southward, and from which date until my arrival in the Roads experienced fine weather.

Barometer 3 P. M. 29.60. and 29.10.

F. D. BUTLER,
Commander, Symmetry.

28th October, 1832.

Report of the Ship NEPTUNE.

24th October.—The gale commenced with rain and very thick weather. At 10 A. M. slipt. At noon, gale increasing, obliged to furl the fore-sail, then under close reefed main topsail, blowing terrifically, head then about S. E., and by S. making no head way, and gradually breaking off. At 4 P. M. it cleared a little, found the *General Kyd* and a brig close to us; At 6 P. M. ship's head off to S. S. W. wore ship immediately. At 9 P. M. saw the land astern supposed to be off Covelong; it appeared very near us, I immediately made sail to get her off

the land, ship's head then about E. N. E. At 11 P. M. fortunately it moderated, and the ship came up to E. Midnight out of sight of land. Tuesday A. M. weather moderating and looking much fairer. At 1-30, made a little sail, at day-light moderate. Barometer and Sympiesometer standing 29.40, *it was no lower in the extreme of the gale*, continued to stand off E. and by N. At 8 A. M. fine weather. 9 A. M. atmosphere hazy, hot and sultry. At noon a light steady breeze from the Southward, found myself thirty-one miles E. of Madras, and seventeen miles to the Southward.

(Signed) W. F. KNIGHT,
Chief Officer, Ship Neptune.

Abstract of Log of the AMELIA MULHOLLAND.

23d October.—At noon the Barometer stood at 29.70, (never having been higher since lying here but one day, when it rose to 29.80,) the weather at this time bearing a threatening aspect, blowing a strong breeze from North; hauled all the cable on deck, veered to 82 fathoms, and saw all clear for slipping; the Bar. falling towards evening to 29.60, the wind increasing towards midnight with heavy squalls and rain to heavy swell setting in from the N. E., making the ship roll heavy.

24th October.—Commenced with strong winds and rain, with heavy puffs. At 5 A. M. the cable parted at 54 fathoms, the ship canting to the Eastward, made sail and stood out East, the wind increasing to a hard gale. At 10 A. M. the wind Eastering and the sea making fast, the ship laying off E. S. E. At 11, set the fore-top staysail to reach her off as much as possible. At noon it blew a hard gale with a tremendous sea, the Barometer down to 29.30, it having rained without intermission the whole morning.

Longitude 80° 38' East, latitude 12° 46' N. by account. At 1-30 P. M. it blew a hurricane, the ship lurching heavy, shifted the (shot and shell) ballast which gave her a tremendous list, making the ship quite unmanageable, carrying the helm hard a weather, the fore-topmast staysail split to pieces, and finding it impossible to take in the main trysail, sent the hands aloft, and cut it down from the gaff, bent another fore-topmast staysail, the gale moderating towards sun-set. The

Barometer inclining to rise. At 5 P. M. sounded in 28 fathoms, set the fore-top staysail to wear ship, but she would not pay off, sent the hands below to trim her, but the ship was labouring so heavy that very little was done. At 6-30, shoaling our water fast, set the reefed fore course, and tried to wear again, but this had no effect, sent the hands below again to trim over more shot. At 8, the gale having greatly moderated and the sea falling, set the double reefed fore-top-sail, but it had no effect, the ship still carrying the helm hard a weather; the water having shoaled to 15 fathoms, clewed up the head sails and brought up. At 9 P. M. in 10 fathoms veered cable to 60 fathoms and stowed sails, the gale moderating fast. Midnight moderate and cloudy; the Barometer having rose to 29.60, after which she had fine weather.

25th October.—Commenced moderate and fine, with a light breeze from the S. Eastward. At day-light found ourselves off the land about three or four miles, Sadras Hills bearing West.

Log of the Ship REPULSE.

The *Repulse* was lying in Madras roads, and at 8 A. M. slipped and put to sea, the wind marked N. N. E., course East. At 10, wind N. E. by E. Noon increasing. At 1 P. M. wind S. E. At 8 P. M. moderating, anchored in 19 fathoms. This ship's Barometer is marked as follows:—

At 8 A. M.	..	..	..	..	29.60
10 „	..	.	..	..	29.29
4 P. M.	..	..	..	..	29.27
6 „	..	..	..	..	29.29
8 „	..	..	..	..	29.35
10 „	.	..	..	..	29.38
12 „	..	..	..	..	29.50

When the weather cleared up the centre of the Sadras hills bore N. W. by N.; she returned safely to Madras.

Log of the Ship PRINCESS ROYAL, Capt. C. J. Lorck.

The *Princess Royal* slipped and put to sea at 9-30 A. M. with a gale at N. $\frac{1}{2}$ E. at 6 A. M. and North varying to the Eastward in squalls when she slipped. She stood out to the Eastward of course, and at

Noon had the wind N. N. E. gradually hauling round to E. by S. At 5. P. M. varying to the South in the squalls to S. E. At 6½ Barometer marked at 29.40. This ship did not anchor, and returned safely to Madras.

Ship LADY CLIFFORD, *Capt. Miller.*

The *Lady Clifford* was at anchor off Nagore in latitude, 10° 48' N. and Capt. Miller, says in a letter to Capt. Biden:—

“By the accompanying extract from the log book of my vessel you will perceive, that the late gale, as far as it came under my observation, had all the characteristics of a circular storm, and that I skirted the South and S. E. range of it, at least I acted upon that supposition, and the result serves to confirm the opinion. It is probable, that I escaped much of its violence by not approaching too near to the centre of the storm, which I imagine must have been to the Northward of my position, and had I been bound to the Southward, I might possibly have avoided it altogether by steering to the S. W. instead of the N. E.

“If these great storms are regulated by a fixed law, the knowledge of it might be of infinite advantage to seamen, by enabling us to make the best of them, instead of being perplexed by the sudden changes and other phenomena, so much against the good management of a ship during their violence.”

I have inserted the log of this vessel without abridgement, as shewing how judiciously Captain Miller profited by his knowledge of the Law of Storms.

Extract of the Log Book of the LADY CLIFFORD.

23d October.—At anchor at Nagore. During this day it blew a fresh gale at North, the sky clear, and weather fine. Barometer 30.05. Towards evening a thick cloud or bank gathered in the N. E., and a long swell set in from that quarter. At 10 P. M. the whole sky was overcast, and the Barometer began to fall. At midnight the wind decreased, and drew round to the N. W. the swell from the N. E. still increasing, sky overcast, but not looking bad. Barometer 29.90.

H.	K.	Course.	Wind.	Bar.
1	...	...	...	29.90
2	...	...	...	29.85
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	29.85
7	...	...	...	...
8	3	N. N. E.	W. N. W.	...
9	4	N. E. by N.	...	...
10	5	...	West	30.00
11	6	N. E.	West	...
12	7	...	W. S. W.	30.00
1	8	...	...	...
2	8	...	S. W.	...
3	7	...	S. W.	...
4	7	...	...	...
5	7	N. E. by N.	...	29.70
6	7	...	S. S. W.	...
7	7	N. N. E.	...	...
8	7	...	South	...
9	7	...	...	29.80
10	7	...	S. S. E.	...
11	7	...	...	...
12	7	...	S. E.	29.90

24th October.—A. M. light wind from the land, sky overcast but fine. Barometer falling. Day-light same weather, cloudy but fair appearance, excepting the thick banks in the N. E. which grew longer and darker, and the N. E. swell still increased; not liking the appearance of the weather, weighed at 7 A. M. and stood to sea. Barometer began to rise, wind freshening at Westward. At 10, wind increasing to a gale, reefed the sails, and made the ship snug, pitched away the jib-boom, split main sail and carried away main topmast-stay. Noon it blew a whole gale, W. S. W. and a drizzling rain commenced, weather looking stormy, but Barometer still high.

4 P. M. gale very severe, could just steer before it with difficulty under close reefed topsails, sheeted *half home*, courses furled, top-gallant masts on deck. 6 P. M. the rain ceased, the sky broke into clouds, and Barometer began to rise. At 8, less wind, sky clearing. Midnight wind abating fast, out close reefs and set foresail, weather looking fine.

25th October.—Day-light fine weather, made all sail, &c. At noon in latitude 11° 9' N. longitude 80° 20' E. At Madras, latitude 12° 20' N. longitude 80° 55' E. Anchored in Madras Roads, at 6 P. M. on the 26th.

—————

Abridged Report of the Ship GENERAL KYD. Forwarded by Captain Biden.

24th October.—At 8-30 A. M. blowing fresh from the Northward with heavy swell rolling in, and the Barometer being at 29.60, deemed it advisable to slip and stand out to sea. 9 A. M. slipped and stood to the Eastward under double reefed topsails. 9-45 breeze increasing fast. Barometer 29.54, close reefed topsails, wind N. Eastward, ship stands S. E. by E. Sails blowing to pieces, ship lying over much; lee gangway under water; stove in all the butts of water on lee side, and hove spare staves and cotton off orlop deck, into the hold. Barometer 29.49. Soon finding the gale increasing fast, tried to heave

the lee carronades overboard, but could not succeed. 12-30, in a tremendous squall, washed lee cutter away, battened hatches down. Water nearly up to main hatch coombings. Barometer 29.44. Sea terrific at 2 P. M. and ship drifting bodily to leeward; at 4 sounded 25 fathoms; attempted again to bend main-topsail without success, but bent the third stay-sail; wind E. S. E. ship heading S. by W. At 5 P. M. gale tremendous, and ship off to S. S. W. water 17 fathoms. Finding that we were drifting fast on shore, called hands aft, and stated that the only chance we had of our lives was to wear ship, at the same time telling them, that it would be no use doing so unless we got the main-topsail on her; the men with one consent said they would do their utmost, and with God's mercy we brought the sail to the yard after wearing ship. At 5-30 by 11 o'clock, the same night the least water at this time 15 fathoms; at 12 o'clock gale moderated and depth of water 18 fathoms; at 1 o'clock, 19 fathoms; at 2 o'clock, 20 fathoms; at day-light fresh breeze at S. Eastward, stood to the Northward out all reefs, and set courses. The Barometer 12 o'clock was 29.43; saw the land about Sadras.

THOMAS T. FEAD, *Chief Officer,*
Ship General Kyd.

Abridged Log of the American Ship FRANKLIN, Captain Richard,
reduced to civil time. From Captain Biden.

24th October.—The *Franklin* slipped and put to sea at 8 A. M., the wind at 9 A. M. marked N. by W. At 2 P. M. N. E., heavy gale throughout. At 7 P. M. wind E S. E. and at 11 E. S. E.

● 25th October.—At 2 A. M. wind S. S. E. and moderating to noon, when latitude 12° 13' N. out of sight of land; she arrived safe in Madras roads with very little damage.

Abridged Log of the Ship DAUNTLESS, reduced to civil time. From Captain Biden.

24th October.—Lying in Madras roads. At noon heavy gale veering from N. to N. N. E. with thick hazy weather. Slipped and stood to sea. Thermometer 80°. Barometer 29.40. P. M. wind

N. N. E., N. E., and East, at 4 P. M. in a tremendous heavy squall with rain. Thermometer 78. Barometer 29.30. At 6 wind, S. E. by S. $\frac{1}{2}$ S. veering to S. E. At 10, S. E. strong gale. At midnight decreasing. Barometer 29.40.

25th October.—Moderating from midnight. At noon latitude $13^{\circ} 00'$ N. longitude $80^{\circ} 30'$ East. Thermometer 84. Barometer 29.50. She returned safely to Madras Roads.

Abridged Log of the Barque MERMAID, reduced to civil time. From Captain Biden.

24th October.—Slipped and put to sea at 7 A. M. Wind at 7 North; at 8 N. N. E.; at noon N. E. by N; at 6 P. M. E. by N. veering S. E.; and Southerly by midnight, when clearing up. Barometer from 29.80; at 1. A. M. to 29.50; from 8 A. M. to 5 P. M. and 29.75 at midnight again.

Brig ARETHUSA.

From the declaration of the Chief Officer, forwarded by Captain Biden, it appears that she put to sea at 9 A. M. standing to the E. S. E. for 6 hours, when the wind “shifted suddenly in a heavy squall to the Eastward,” throwing the vessel on her beam-ends. The masts were cut away, and the vessel anchored in 7 fathoms, but the surf carried her on shore, when she was wrecked.

The FRANCES SMITH and Brig RUBY.

The *Frances Smith* put to sea, but appears either to have been too crank, or leewardly, or not to have carried sufficient sail to obtain an offing, and she was driven on shore and wrecked. The brig *Ruby*, a coasting craft, was also wrecked to the Northward of Madras.

From Pondicherry.

Captain Biden forwards me from this port several reports from residents, which I have printed below, and an official declaration before Captain Hostein, the Master Attendant of that port, relative to the loss of the *Antoinette*, Captain Prudhomme, and other vessels.

Reports from Pondicherry.

24th October.—The day the gale took place, the Barometer which had fallen on the previous day, rose at 8 o'clock to 28 inches and 2 lines. F (or 30.05 Eng.) At $\frac{1}{2}$ past 9 o'clock, it began again to fall gradually until noon, when it was at 28 inches, 0 lines, and 8 points (or 29.90 Eng). It continued to fall, and at 2 o'clock, at which hour a signal was made for vessels to get ready to put to sea, the Barometer was at 27 inches and 10 lines; (29.80 E) still falling, at 3 o'clock the wind was very strong, the sudden gusts becoming very fierce; the Barometer having somewhat further fallen. At a $\frac{1}{4}$ before 4 o'clock, the gale was blowing from N. E. to W. until 20 minutes past 5 o'clock. The Barometer was then at 27 inches and 2 lines, (29.15) when suddenly the wind became lulled until 6 o'clock, but afterwards it blew fresh from the S. W. During the calm, the Barometer fell below *storm*, but rose again in the evening.

Second Report.

24th October.—The Barometer had fallen to 26 inches and 10 lines, (28.65 E) two lines below *storm*, and remained thus from 20 minutes past 5 o'clock until 6, when the wind began again to blow strong from the S. W.

On the 2d instant, the Barometer was at 28 inches and 3 lines (30.1 E).

During the gale, the Barometer fell half an inch below what it did in the gale of 1830, and was stronger than any I remember in these parts.

It is to be remarked, that from 2 to 5 o'clock in the afternoon, at the most violent part of the storm, *the oscillations of the mercury* in the Barometer were so apparent, that it rose and fell instantaneously 2 to 3 lines, as though somebody had shaken the Barometer.*

It appears from the reports received, that the storm reached to the W. to the distance of 75 miles, consequently from 70 to 80 leagues from W. to E., for Captain Thevenard was not at the limit of the storm when he felt it, at 40 leagues to the East.

From S. to N. the storm does not appear to have made so large a zone, as it was not felt further than Porto Novo.†

* Italics are mine.

† This is an error, as it was distinctly felt at Nagore, a degree farther South.—H. P.

This gale in its course, was contrary to what it is generally; the wind blows from the N. W., flies round to the N. E. in passing by the N., and then to the E. and the S. This time the wind flew to the S. and S. E. in passing by the S. W. and it remained many days from the S. not strong, but the drops of rain were very large.*

Certificate from the Master Attendant of Pondicherry.

“ I, the undersigned do declare and certify, that the English bark *Antoinette*, Captain Prudhomme, arriving from Cochin and Tranquebar with a part of her cargo on board, anchored in the roads of Pondicherry on the 2d of October last.”

On the 23d of the same month, in the afternoon, the Captain was on shore, and the weather having assumed a bad appearance, the surf became so high that communications with the roads were interrupted. *On the morning of the 24th the Barometer had risen,†* and we thought that the weather had settled; nevertheless the surf was always very high, and Masula boats could not go through it.

There were in the roads, the English barques *Antoinette* and *Appolon*, the English brig *Cervantes*, the French brig *Le Mirabeau*, and the Dutch barque *Corsair*.

At 10 A. M. the Barometer began to fall, the wind was blowing moderately by squalls from N. W. to W. N. W. It was raining in the squalls. At noon the wind blew harder, the Barometer always falling. At half-past 12 o'clock the Dutch barque *Corsair* which was to windward of the *Antoinette*, dragged her anchor, and seemed to fall athwart the hawse of the *Antoinette*. The rain which was then falling in great abundance, though the wind was not very strong, hindered us from seeing both ships, which after having appeared a moment together, separated themselves, and the *Corsair* had anchored on the larboard side of the *Antoinette* at a small distance. At 2 P. M. I made signals to the ships to get under weigh immediately. The sea was very high in the roads, and the ships pitched a great deal at anchor. From

* This, it will be seen, depends upon the storm passing to the North or South of the observer, as also upon its track.

† Italics are mine.—H. P.

half-past 1 o'clock P. M., it rained so heavily, that not a single ship could be seen, the wind was always from the same direction, and blew by squalls very strongly. The Barometer was always falling. At 4 o'clock P. M. a most violent hurricane had set in, the flagstaff and the trees which were in the streets of the town were broken and torn up by the whirlwind. At 20 minutes past 5 P. M., the wind from the N. W. to W. N. W. ceased on a sudden, and after a moment of calm, the hurricane began with a new violence from the S. W. to the South.

When the wind came round to the S. E. it began to abate, it was then 9 o'clock P. M., and during the night the wind became very moderate.

On the morning of the 25th, the weather became pretty fair and the sea was not high; the Brig *Cervantes* was recognized anchored six miles to the N. E. of Pondicherry, having only her lower masts standing; the Captain went immediately on board, and when he returned, he told me that his Chief Officer gave him the following report: The *Corsair* in dragging her anchor ran foul of the *Antoinette*, and carried away her bowsprit, and a little while after both of her top-masts went. Afterwards when both ships had separated, the *Antoinette* ran foul of the *Corsair*. Both ships seemed much to injure each other, for the sea was very high.

Of the five ships above named, two only came back into the roads, the *Cervantes*, and the *Mirabeau* which appeared on the morning of the 26th, having lost her main-mast, which the Chief Mate has been forced to cut away in order to lighten the ship, which was on her beam ends.

Having learnt that pieces of wreck had come ashore at about 12 miles to the North of Pondicherry, I informed the Captains of the five ships of it. Captain Prudhomme having gone to the place where these wrecks were lying, recognized amongst them several pieces belonging to the *Antoinette*.

These numerous wrecks which confirm the report made by the Chief Mate and crew of the *Cervantes*, leave no doubt of the loss of the *Antoinette*, which had on board the Chief Mate and a crew of 24 men; as well as her cargo, which was almost complete. The lower part of the mizen-mast of the *Corsair* having come ashore, we must

suppose that those ships have foundered in consequence of the injuries received when fouling each other. Since the hurricane, the breeze has constantly ranged at first from the S. E. and afterwards from the N. E., which would have brought them into the roads if they had been afloat. The hurricane of the 24th October extended itself to a great distance from Pondicherry, and on the same day ships have been dismasted at 200 miles to the east of Pondicherry, while five ships from Madras roads came on shore in the neighbourhood of that port.

(Signed) A. HOSTEIN,

Pondicherry, 1st December, 1842.

Master Attendant.

(A true Copy.)

(Signed) A. PRUDHOMME.

Storm at Pondicherry.

We are indebted to a correspondent at Pondicherry for a detailed notice of the storm of the 24th ultimo, as experienced in the vicinity of that town, from which we extract the following particulars: On the 23d the Barometer at 6 A. M. stood at 30 inches, but its fall during the day indicated an approaching storm. At 6 P. M. the sea was very rough, and during the night the waves rose to a great height. At 7 on the morning of the 24th, the raging of the sea was terrible. The sky was overcast with heavy clouds, especially in the North-East and North-West. At 8 A. M. the Barometer had fallen to about 29 inches, apparently indicating a hurricane. The surf was extremely violent, the waves breaking over the vessels, and at 8½ heavy rain commenced falling, and the wind set in from the North-West, both gradually increasing in violence as the day proceeded. The Barometer continued falling till 6 in the evening, the wind varying from North-West to South-West; about this hour there was a short period of calm, when the wind suddenly shifted round to the South and South-East, blowing from this quarter with as much fury as it had previously done from the opposite one. At 9 P. M. the wind moderated, and it gradually became calm. From 10 A. M. to 9 P. M., the rain fell in torrents, without ceasing. At the moment that the storm suddenly shifted to the South and South-East, the Barometer had attained its lowest

point of depression, the mercury having fallen to 28 inches, or "stormy," being half an inch lower than it has been observed since the storm of 1830. It was at 8½ P. M. that the mercury began to rise again.

In the morning, the following vessels were in the Roads: *Cervantes*, *L'Appollon*, *L'Antoinette*, *Le Mirabeau*, and *Le Corsair*. They put out to sea at 2 P. M. on cannon being fired as signals from the port. The *Mirabeau* and *Cervantes* returned with loss of masts and other damage, but the *Appollon*, *Antoinette*, and *Corsair* had not made their appearance, and great fears were entertained for their safety. The ship *Nouveau Tropique*, which had left two days previous for Madras, regained the Pondicherry Roads with much damage. The officers of the vessels which returned, reported that they had never witnessed so severe a storm; its ravages are described as extending inland for 18 or 20 leagues; in Pondicherry itself many houses were damaged, and two lofty chimneys of the manufactory of Messrs. Fontain and Co., 100 feet in height, were thrown down by the storm.

Coupling the above interesting particulars of our Pondicherry correspondent with the appearance of the storm here, where it was much less violent, and at Cuddalore, where a former correspondent seems to have conjectured very rightly, they had "but the tail of it;" the probable loss at sea of *three* vessels off Pondicherry, and the known wrecks of *five* near Sadras, with other casualties to the South, we are much inclined to arrive at the conclusion that the storm of the 24th ultimo was a true rotatory hurricane, whose centre or vortex was somewhere out at sea, between the latitudes of Pondicherry and Sadras—a conclusion to which we invite the attention of our scientific readers. We may add, that at Madras the wind at 10 A. M. was North and continued in this quarter till 2 or 3 P. M. At 4 P. M. it was N. E. by E. At 8 P. M. had moderated considerably. At 10 P. M. had shifted round to the South-East, and during the night became calm.—*Madras Spectator*, Nov. 5.

The Madras *Athenæum* furnishes the following further particulars of the late gale:—

"The following statement from the Master Attendant, details further mischief occasioned by the recent gale.

Intelligence from Porto Novo.

“24th October.—Brig *George* came ashore, fresh gales from the N. W.; 6 P. M. shifted to S. W.; midnight wind due South, much moderated; 3 A. M. 25th, fresh Southerly and S. W. breeze, with occasional heavy gusts.”

Having addressed Captain Campbell, Assistant Surveyor General, Southern India, to request that he would assist me in procuring such information as he could obtain to assist in tracing the storm inland, he has obligingly sent me in addition to his official report, those mentioned in the following extracts from his private letter:—

Ryacottah, 8th March, 1843.

“Ryacottah is in latitude $12^{\circ} 31' 20''$ N. longitude $78^{\circ} 4' 44''$ E. and by elevation is about 3145 feet above the sea, as deduced from the data of Col. Lambton's Survey.

I send you a set of observations with the Barometer made at Bangalore by Mr. Garrett, with the same instrument as before, he only remarks on the 25th, “Rain and tremendous wind at night.” These observations with both instruments are merely corrected for the peculiarities of the instruments.

The former observations were reduced to 32° , for an expansion of 0.018018 feet for each inch of mercury, and for 180° of temperature according to Dulong and Petit.

I enclose also some observations made by Lieut. Robertson, Superintendent of Roads near Patcheroopum in the Amboor valley, which place you will find in the 78th sheet of the Indian Atlas, to be about 34 miles S. by W. of Vellore.

I conceive the reason of the strength of the storm not being felt there arises from some high precipitous hills which shelter the plain of observation.* The instrument is a very fine one, but I do not know if it has been compared.

10th March.—I have this morning received from Capt. J. Green, the Superintending Engineer at Bangalore, a splendid draft of the storm, taken with Newmann's self-registring machine. You will see that

* I have no doubt this was the true reason, and that it might, as in the case of Gyah and Pooah, in my Seventh Memoir, Vol. XI, Jan. 8, have been *seen* overhead.—H. P.

there, as here, it began at North, but shifted to the West, in which direction and S. W. it was at its height from 12 to 2 of the night of the 24th. The pressure is I suppose pounds on a square foot. The wind then came back to North again at 10 A. M. of the 25th, and then to South suddenly at a quarter before 1 of the 25th, and at 5 P. M. shifted to East.

October.	Bangalore.		Ryacottah.	Difference.
12	27.231		27.219	—012
13	27.215		27.183	—032
14	—223		—191	—032
15	—178		—153	—025
16	—180		—137	—043
17	—176		—139	—037
18	—133		.....	.....
19	—137	At 10 A. M.	27.119	—018
20	—149		.....	.....
21	27.160		27.099	—061
22	—166		—101	—065
23	—162		—087	—075
24	—119		—035	—084
25	26.972		26.961	—021
26	27.033		27.029	—004
27	—052		.....	.....
28	—158		27.059	—099
29	—125		—119	—006
30	—127		—129	—002
31	—125	—109	—016	
24th—4m.			26.939	—033

The following Report has been kindly forwarded to me by the Magistrate of Mangalore.

Your letter of the 16th April, addressed to the Magistrate of Honore, reached me a short time ago. I have now the pleasure to send you some notes of the weather, from the 24th to the 27th October, 1842, kept in my office. The direction of the wind is probably not exactly correct, as there is no vane at the station.

The appearance of the sky was very disturbed on the 25th and 26th, and I felt certain, that a severe gale of wind must have been blowing on the opposite side of the Peninsula.

Notes of the Weather at Mangalore in October, 1842.

- 24th.—Heavy rain
 25th.—Light showers with strong gusts } Thermometer maximum
 of wind from the N. W... .. } 75°.
 26th.—Cloudy, light showers, strong southerly winds.
 27th.—Ditto ditto.

HENRY BLAIR,
 Magistrate.

Abridged Report from the French settlement of Mahé.

Desirous of obtaining information from every possible point along the coast, I addressed M. Bourgoïn, the Governor of the French settlement of Mahé, requesting he would kindly collect for me all that could be gleaned there. The substance of his letter in reply is, that there were no regular observations registered by any person at that settlement, nor at Karical; but that towards the close of October 1842, no person recollects any particular bad weather, or such signs of it as might have indicated that a storm was raging elsewhere, and this is corroborated by those, who from time to time keep detached notes of remarkable changes. At Mahé, between the 23rd and 27th October 1842, nothing of note occurred in the appearance of the weather, or of the sea at Karical. The rains began on the 22nd October, but without any wind worth noting: the surf only was rather high.

Observations from Patcheroopum in the Amboor Valley, about 34 miles S. by W. of Vellore, or about Latitude 12° 22' N. Longitude 79° 6' E., and bearing from Madras about S. W. by W. 85 miles, by Lieutenant Robertson of the Madras Army. Forwarded by Captain Campbell, Assistant Surveyor General.

24th October.—8 A. M. Thermometer 73°. Barometer 28.798. Rain guage $\frac{27}{10}$ inches, wind N. E. with drizzling rain throughout the day. Squally at night.

	Ther.	Bar.	Rain Guage.	Remarks.
25th Oct.— 7 A. M.	73°	28.876		Cloudy, wind moderate.
„ 12 A. M.	75°	28.912	$\frac{2}{10}$	Ditto ditto.
„ 3 A. M.	75 $\frac{1}{2}$ °	28.886		Ditto ditto.

	Ther.	Bar.	Rain Guage.	Remarks.
26th Oct.— 7 A. M.	73°	28.936		Cloudy, with light wind.
„ 10 A. M.	74°	28.944		Ditto ditto.
„ 12 P. M.	77°	28.914		Ditto ditto.
„ 3 P. M.	78°	28.904		Ditto ditto.
„ 8½ P. M.	76°	28.944		Ditto ditto.

Official Report by Captain J. Campbell, Assistant Surveyor General.

1.—From the end of September, the Barometer was observed to have gradually risen daily, which in this situation generally indicates approaching rainy weather, and accordingly on the night of the 12th October, a fall of 2.4 inches of rain took place, the Barometer standing at 27.095 inches, having risen from 26.862 inches on the 28th September: both observations being made at 10 A. M.

2.—From the 12th October, the Barometer gradually fell again until at 10 A. M. on the 23rd October it stood at 26.971 inches, when there was but little wind, clear blue sky and Cirri; but before noon, the wind had increased from N. E. bringing with it moist air which gradually condensed in Cirro Cumuli, and then Nimbi. In the evening the wind had lulled again, but in the night it again increased in strength; and at sunrise of the 24th, was blowing strong at N. E. with an overcast sky, but no signs of rain. At 10 A. M. the Barometer stood at 26.927 inch, with the wind falling again, and a little drizzling rain. At 4 P. M. the wind was high at North with drizzling rain. Barometer 26.820 inches. About 7 P. M. after dark, wind began to increase with rain from North; and between 8 and 9 o'clock, had become strong enough to blow in some cracked panes of glass in a window in an exposed situation. Observations of Barometers forgotten in the confusion of securing doors and windows for the evidently approaching gale.

3.—Early in the morning of the 25th October, the Barometer stood at

1½ A. M. 26.648 inches, gale at its height from the North. Tiles from the houses beginning to fly. Little rain, sky overcast. Thick in East and South; in North an uncommon light in horizon, as if shining under an arch in a canopy of mist about 2° in altitude above the horizon.

- 3½ A. M. 26.636 inches. Wind at East, many tiles blown off houses on North and East sides. Dark in North. The uncommon light in East. Thick in South and misty with rain.
- 6½ A. M. 267.40 inches, wind veered to S. E. lulling a little, rain heavy.
- 7 A. M. 26.778 inches.
- 7½ A. M. 26.788 inches.
- 8 A. M. 26.812 inches, wind at South, much fallen.
- 9 A. M. 26.832 inches, wind very much fallen, but still high, mist and drizzling rain, wind seemed veering Westerly.
- 9½ A. M. 26.854 inches, wind a strong breeze, mist, no rain.
- 10 A. M. 26.864, wind strong at S. E. fog and mist.
- 11 A. M. Fog risen and a little sunshine; air particularly clear, wind light.
- 4 P. M. 26.793, overcast sky, wind high, rain about in showers. Barometer observations discontinued. The minimum pressure observed by two instruments. The observations given are corrected and reduced to 32° Fahrenheit. Instruments the same as last report.
- 4.—On the 26th October, the Barometer stood 10 A. M. 26.932 inches, morning misty and wet, wind fallen rapidly, blowing as usual from N. E.
- 4 P. M. 26.839, Blue sky, Cumuli and Nimbi.
- 5.—After the 26th, the Barometer rose again as gradually as it fell. It must be remembered, that however easy it may be to the practiced seaman to note on the sea shore, or in flat country, the direction of the wind; yet among the vast granitic mountain masses of a country like this, it is by no means easy to tell with certainty, even within 3 points, from which quarter the wind is blowing: its direction being as often *up and down* as any other.

J. CAMPBELL,

Ryacottah, 9th January, 1843.

Asst. Surveyor General.

Captain Newbold of the M. N. I., Assistant Commissioner at Kurnool, has favoured me with observations from Bangalore, Bellary, and Hydrabad, and with some suggestions of his own, of which I shall avail myself at length in the Summary, which as usual, will follow the

detail of the observations. From the notes forwarded by Captain Newbold, it would seem that at Hydrabad, nothing of note was experienced. At Bellary, latitude about $15^{\circ} 6'$ N. longitude $77^{\circ} 5'$ E. the Barometer fell from the 23rd October to the 27th, from 28.65 to 28.55* (height of the station above Madras not given,) and by the 29th had risen again to 28.65. The weather cloudy at times, and the winds from N. to NE. and NW. to the 25th, and then for four days from the SE., but the weather quite fine. At Bangalore on the 25th October, a good deal of wind and rain, almost a storm, the direction not noted. This we have from Capt. Green's observation, as forwarded by Capt. Campbell, and mentioned in the extracts of his letter, page 366.

The following Notes are extracted from a second letter from Capt. Newbold, who has also obliged me with some views, which will be found at length in the Summary.

Since my last, answers have come to my queries from the Southward, decisive of the truth of my supposition of the current's having passed over the peninsula in an easterly direction, to the great gap of Coimbatore, thus bursting through the lofty ghaut barrier upon the Arabian Sea and islets immediately opposite. It was felt severely at Salem, $11^{\circ} 41'$ N. Lat. blowing from the N. E. right in the direction of the gap, and clearly proving the Southerly direction imparted to part of this Easterly blast by the contour of the hilly barrier.

At Madura, $9^{\circ} 57'$ N. Lat. or $1^{\circ} 44'$ South of Salem, the storm was not felt in the least, nor at Paumban $9^{\circ} 18'$ N. Lat. on the coast, where the weather on the 4th and 5th October rather finer than it had been. On the 5th, wind from S. W., fresh breeze with lightning from N. W. from 7 to 11 P. M., and wind from same quarter on the 6th October; wind a little stronger and from same quarter, and a little thunder and lightning at the same hour. On the 7th, the wind was light, thunder and lightning as before. No barometrical remarks made. Those of the Thermometer have nothing worthy of remark.

It is evident, therefore, that the storm did not extend so far South down the coast as Paumban, and from its not being felt at Madura, probably not so far as Point Calymere.

* See in following page the observations from Bombay.

For the information condensed above, I am indebted to Mr. Fischer, and Messrs. Cadenhead of Salem, Dr. Gill of Madura, and Lieut. Robertson at Paumban.

From F. H. CROZIER, Esq. Sub-Collector, Malabar, I have received the following letter and report.

DEAR SIR,—With reference to your letter of the 16th date, I have the pleasure to enclose the remarks entered on the records of the Master Attendant's Office at Tellichery, and regret being unable to procure you more particular observation of the appearances and variation of the Barometer, &c. during the period you specify. I at the time alluded to, happened to be officially engaged, about 25 miles to the North of Tellichery on the coast, and immediately in the rear of Mount Dilly, a lofty hill, as you are aware, projecting into the sea, and forming almost the only safe anchorage and harbour during bad weather on this coast. I remarked at the time that it was *most unusually* filled with Pattamars, (the craft of the coast,) and was given to understand they sought refuge from the bad weather at sea and on the coast. The sky looked very stormy at the time, but I do not recollect any intimation of the vicinity of a gale further than being prevented myself, on the 29th of October, from crossing, as I am accustomed to do, the Bar at the entrance of the Cavery river close to Mount Dilly, by the extreme violence of the surf. I had crossed the Bar a few days earlier in the month. I was detained for two or three days after and before the 29th.

Yours obediently,

F. H. CROZIER,

Sub-Collector, Malabar.

Malabar, 6th May, 1843.

Date.	Winds during the past Week.	Weather during the past Week.
	October 1842.	Tellicherry.
23rd	Light breezes, the Westward, }	Fine during the day, towards evening squally over the land.
"	Light breezes variable, N. W. to S. W., and S. E. during the night, .. }	Cloudy, with lightning at intervals.
24th	Light land and sea breezes, }	Fine during the day, towards evening squally over the land.
"	Light breezes variable, N. W. to S. W., and S. E. during the night, .. }	Cloudy, with thunder, lightning and slight showers at intervals.
25th	Moderate breezes, the Westward during the day, }	Cloudy, with drizzling rain.
"	Strong breezes, the S. W. during the night }	Cloudy, with lightning and slight showers at times.
26th	Strong breezes variable, S. E. to South during the day, }	Cloudy, with slight rain.
"	Strong breezes, the S. W. during the night, }	Cloudy, with drizzling rain.
27th	Fresh breezes, S. W. during the day, .. }	Cloudy.
"	Fresh breezes, S. W. during the night }	Cloudy, with lightning and drizzling rain at intervals.
28th	Fresh breezes, S. W. during the day, .. }	Cloudy.
"	Fresh breezes, S. W. during the night, .. }	Cloudy.
29th	Light breezes, the Westward during the day, }	Fine.
"	Light breezes variable, S. W. to W. during the night, }	With passing clouds and lightning.

From the Bombay Times of 9th November.

THE MADRAS HURRICANE.—We gave in our last numerous extracts from the Madras papers of the 25th, in reference to the hurricane which occurred on the preceding day. On examining the meteorological records of the Observatory, we find that the first manifestation of this atmospheric disturbance prevailing in our neighbourhood—for here, unless in the heavy swell which extended to the harbour, we had no actual symptoms of storm till the evening of the 30th—became apparent on the 25th; we had then some lightning in the evening, with a rather troubled sky towards the eastern horizon, and the barometer fell about .030. This state of depression continued till the 29th, long before the thunder-storm and rain of the 31st, of which scarcely any prognostication was given, when the mercury had rallied to its usual level. The following note gives the means, the maxima and minima, and the range of a large standard barometer by Newman; the obser-

vations are corrected for temperature to 32 deg. F., and for capillary attraction:—

	October	24th	25th	26th	27th	28th	29th
Mean of 24 hours' observation, ..	29.720	.699	.643	.626	.665	.732	.732
Maxima,	29.810	.788	.712	.675	.722	.791	.791
Minima,	29.664	.620	.659	.573	.609	.691	.691
Range during 24 hours,		146	188	053	102	113	100

From this it will be seen that the day of greatest mean, as well as of greatest minimum, depression, was the 27th;* the day of least range, when the ordinary bi-diurnal fluctuations of the barometer were most affected was the 26th, when the range was about half what it ought to have been, the interval betwixt the maximum and minimum being only .053. The Madras papers give the barometric readings uncorrected, and do not note the temperature so as to enable us to apply the correction, whereby we should have been enabled to give an exact comparison of the fall of the instruments here when the influence of the storm reached us, but nothing more, as compared with that of the Madras barometers where it was raging round. It must be kept in mind that at 10, or rather at 9-45 A. M., the barometer is at its maximum, and at 4 P. M. it is at its minimum elevation, and that in the finest weather the range betwixt these two hours amounts to about .150. On the 24th ult. it stood at Madras, at the first named of these hours, at 29.873; and at the second, at 29.7054: so that the total depression amounted to 1626, or to about one-hundredth of an inch over the average. The mean of 700 hourly observations during the month of September gives .094, as the average range at Bombay betwixt the hours of 10 A. M. and 4 P. M.; the depression at the former of these corrected, as formerly stated, 29.676, that, at the latter, being 29.582. If these circumstances be overlooked, the barometer will appear to be on the rise or fall just as it happens to be examined, not more than five hours before or after 10 A. M., or P. M., the hours of maximum elevation. Were vessels, when in port, any where in the neighbourhood of a meteorological observatory, to have their barometers and sympiesometers corrected and rated by some recognized standard, it would greatly enhance their value as monitors of approaching storms, and enable meteorologists to avail themselves of the logs and records kept at sea, to an extent which at present it were vain to attempt.

* It will be noted also that this 26th and 27th was the day on which the *Lucy Wright's* storm was nearest to Bombay.—H. P.

The indications of scarcely any two barometers exactly agree; and betwixt the tropics, where the total range scarcely exceeds three-tenths of an inch, the most delicate movements of the mercury must be watched. In marine barometers, besides, the correction for the rise of the quicksilver in the cistern can very rarely be made with any approach to accuracy, and scarcely ever, in any two instruments, however similar, precisely corresponds. It depends upon the relation of the diameter of the tube to that of the cistern, the latter varying not only in different instruments, but in different portions of the same: this invariably makes the observed depression less than what it ought to be. It is still worse with the sympiesometer, whose indications of pressure are so complicated by high temperatures, that unless to those long familiarized with it, it is of little value between the tropics. These imperfections would in a great measure be remedied, were the observer in possession of a schedule of corrections which he could at any time apply. These considerations, if considered of value, might be tested here by the Indian Navy; and we have no doubt would be productive of important results. The instruments, indeed supplied by the Company, especially the thermometers, are often of such indifferent quality, that unless rated or corrected, they are comparatively of little use. Instead of lumbering about amongst arsenal and naval stores, they ought to be placed where they could be taken care of and kept in order; where their excellencies could be pointed out, and their imperfections remedied. It would appear incredible were it stated, that the efficiency of a very able and experienced engineer corps is in many cases neutralized by the wretched economy that refuses to supply instruments fitted for service! Yet we have been told of an extensive district under the supervision of a very able officer, where levelling and general surveying is constantly required, where there is not a level or theodolite fit for the common purposes of road-making; and where, in consequence, the services of highly-gifted and well-paid officers are impeded or thrown away for a consideration, which would not amount to a single week of the pay and allowances!

The Madras gale was encountered by the *Seaforth* Ceylon steamer off Cochin, at 10 p. m., on the 25th; it dismasted the *Lucy Wright*, near Mangalore, on the 26th;* the *Futtay Salam*, from Calcutta, was overtaken and nearly swamped by it, close to the Laccadive Islands;

* In the following extract it is said on the 27th.

the *Cleopatra* steamer encountered it on her way to Aden, and the *Semiramis* had a midshipman washed overboard when on her voyage from the Persian Gulf. We should feel greatly indebted to any officer whose vessel had been exposed to it, if he would favour us with an extract from his log, as to the time when, the place where, and circumstances under which the gale, or its symptoms, were experienced by him.

The Ship LUCY WRIGHT.

Letters have been received from Captain Pollock of the *Lucy Wright*, bound from Liverpool to this port, announcing that his ship, was totally dismasted on the 27th ultimo, in a hurricane in lat. 13° 2' N. and 71° 39' E.

The *Lucy Wright* was off Rutnagherry on the 4th instant, and the Captain mentions that her hull has escaped uninjured.

The hurricane appears to have occurred about the same time as that which has done so much damage at Madras, and as it attacked the *Lucy Wright* in the same latitude as Madras, it is not improbable that it was one and the same gale.—*Ibid.*

Extract from the Log Book of the ship HIGGINSON, nautical time from a Newspaper.

28th October.—Barometer fell at 6 A. M. from 29.40 to 28.50. Lat. 18° N. Long. 70° 20' E. “Very heavy gale from West to South with thunder, lightning and much rain, all sails furled, and ship hove to, continued so for six hours, when it began to abate.”

Abridged Log of the ship FUTTAY SALAAM, from Mauritius to Bombay. Forwarded by G. BUIST, Esq. H. C. Astronomer at Bombay, reduced to civil time.

24th October.—Noon to midnight light breezes W. S. W. to W. N. W. and fine.

25th October.—From noon winds W. N. W. to N. W. and fine, three and four knot breeze, noon Lat. 7° 55' N. Long. Chron. 68° 14' E. P. M. moderate, 4 to 7 knot breeze, W. N. W. to N. W., increasing at midnight and “a chopping sea getting up,” steering to the N. by E. throughout.

26th October.—Midnight to noon 6 to 7 knot breeze, with heavy N. W. swell, “ship plunging much at times.” Noon Lat. acct. $10^{\circ} 16'$ N. Long. $68^{\circ} 54'$ E. 8 M increasing fresh gales W. by N. At midnight S. W. going from 4 to 6 knots to the N. by E. At midnight a gale at S. W. making all snug, vessel making much water.

27th October.—The gale increasing to a hurricane at S. S. W at 4 A. M. when hove to. At 9 A. M. wind marked southerly. At 6 A. M. “blowing complete hurricane, ship perfectly unmanageable, lashed the helm a lee. Tarpaulins in the main and mizen rigging to keep the ship to.” Noon gale increasing with a very high sea, vessel straining much. Lat. by acct. $11^{\circ} 55'$ N. Long. $69^{\circ} 09'$ E. The ship lying to, wind marked S. E. blowing a furious hurricane with a tremendous high sea. At midnight gale, but more moderate.

28th October.—A. M. moderating, but still dirty with violent squalls and heavy rain. Daylight, (6 A. M.) moderating fast, at which time “bore up N. West to clear the Byramgore Shoal.” At noon Lat. acct. $13^{\circ} 31'$ N. Long. acct. $68^{\circ} 09'$ E. After which fine weather.

The logs end here somewhat abruptly; that is to say, they are not copied up to one having an observation for Lat. and Chron. which is always desirable, for by working the log both backwards and forwards the vessel's true place is better ascertained, and much light is thrown on the action of the currents generated by the storm.

From the Bombay Times.

We subjoin a very interesting notice from Dr. MALCOLMSON of the effects of the Madras hurricane of the 24th of October, for such we have no doubt that it was, off the Arabian coast, where it appears to have reached on the 30th:—

To the Editor of the Bombay Times.

SIR,—In your paper of the 30th ultimo, you requested communications in reference to the late Madras Hurricane, which appears to have swept over a large space, and to have been very destructive in its progress.

Since the publication of Colonel Reid's work on the Law of Storms, the subject has attracted, much attention both in a philosophical,

maritime, and practical point of view. Agreeing with the Colonel, that much good would result from the rotatory motion of Gales being understood and acted on by commanders of vessels, when caught in tempests, with this object in view, every authenticated fact that bears on the subject should be carefully collected for future deductions. On this account, I send you a few particulars of the gale or hurricane the ship *Seaton* experienced on her passage from Aden towards Bombay, in which she was dismasted, narrowly escaped foundering, and regained the port with great difficulty under jury masts, leaky, and her hull so much injured, that she has been condemned by survey.

After leaving Aden, the *Seaton* had moderate breezes from the Northward, with clear weather; for two or three days before the gale was felt, they had a very uneasy, broken and turbulent head sea, with light northerly winds, which enabled them to carry royals and main sky sail.

On Sunday the 30th of Oct. P. M., the breeze gradually increased so much, as to require the smaller sails to be stowed, top sails double reefed, main sail and jib also stowed, wind N. and by West. The atmosphere, at this time, had a streaky, hazy, troubled appearance. Barometer falling. When the vessel first felt the head sea, the Barometer indicated atmospheric derangement, but not to such an extent as to induce any apprehension of an approaching gale.

The Barometer being a tried one, led to the belief that rough weather was to be expected, and preparations were accordingly made to meet it. On Monday the 31st, being then in Lat. 14° N., Long. 61° E., whilst in the act of taking in all sail, and having succeeded in getting the top-sails and foresail clued up, and foretop sail partly stowed, the hurricane burst in all its fury. In an instant every stitch of canvas was blown from the yards; even the mainsail, though well secured, was blown from the gaskets, went to pieces, and was entirely lost; as likewise every other sail that was stowed. At 9 A. M. the main top-gallant-mast went by the cap; at 11, the quarter boat was blown away, with one of the iron davits; at 12, the hurricane still increasing and blowing in furious gusts, the ship was thrown nearly on her beam ends. Ballast shifted, water washing up to the lower deck beams, the sea at this time running high and making a complete

breach over her,—and from the shifting of her ballast and quantity of water in her hold, she appeared to be bodily settling down. Barometer still falling, and the danger imminent; the main mast was cut away, after which she righted a little, and rose lighter to the sea, but still with a heavy list to starboard. From the great straining of the ship, the water continued pouring in through every seam. At 2 P. M. the foretopmast was carried away a foot above the cap. At 3, the foremast went, four feet above deck, carrying every thing with it; part of the wreck falling across the long boat and pinnace, stove both at nearly the same time. The mizen-topmast gaff, and spanker boom fell on deck, leaving nothing standing above board but the mizenmast. From the exhausted state of the crew, the heavy rolling of the vessel, and the sea continually breaking over her, it was found impossible to clear away the wreck, which, also striking under the counter and different parts of the vessel, threatened serious consequences. Sunday 1st November at day-light, the wind lulled a little. At 8 A. M. the hurricane recommenced with redoubled fury. The wind which before was N. and by W. suddenly shifted to the E. S. E. and settled at E. N. E. Sea breaking over her fore and aft, making a clear sweep of the deck. It is a matter of surprize and congratulation, that none of the men were washed from the pumps, which were kept incessantly going during the intervals of the sea; the spray was flying so furiously and thick, that the forecastle could not be distinguished, and every part of the body that was exposed, smarted from its effects.

On Sunday night the 30th, the Barometer fell to 29.7. During the height of the gale its lowest range was 27.6. The 1st Nov. it rose to 28°: it began to rise four hours before the gale moderated. 2nd, moderate breezes, sea going down, all hands engaged in clearing away the wreck, and getting up some spars as jury masts. Got her before the wind and bore away for Aden, where she arrived on the 15th in a very shattered state, crew exhausted from having been constantly at the pumps.

It is worthy of remark, that during the hurricane, for such it was, the wind which was N. N. W. at its commencement, veered to the Westward, backed round to the E. S. E. and E. N. E. This agrees perfectly with Reid's now generally admitted theory, of the circular and

progressive motion of storms. It was fortunate that the *Seaton* was on the proper tack when the wind changed ; had it veered forward instead of aft, before the loss of her masts, it is more than probable she would have gone down by the stern, as many ships are supposed to have done in similar hurricanes.

On Sunday evening, the 30th October, there was neither cloud nor fog-bank in the western horizon, yet the sun went down fiery red and contracted in appearance. His rays instead of glancing obliquely across the waves, seemed to dip and lose themselves almost perpendicularly in the long heavy swell. During the height of the storm the rain fell in torrents, the lightning darted in awful vividness from the intensely dark masses of clouds that pressed down, as it were, on the troubled sea. In the zenith there was visibly an obscure circle of imperfect light of 10 or 12 degrees. When the hurricane took off, the scene to leeward was awfully grand,—thick masses of the darkest purple-coloured clouds were rolling over each other in inconceivable confusion, tinged and lighted up in different places by intensely vivid lightning. The hoarse roar of the retiring storm, mingled with the hollow growl of continued thunder, as they slowly retreated with the gale, left an impression on the mind not easily to be forgotten ; the respiration of every person on board was affected : this is to be accounted for by the electric state of the atmosphere with which all hurricanes seem to be intimately connected, if not entirely excited and influenced thereby. The lowest range of the Barometer was 27.6. At Bangalore, in which appears to have been the same gale, it fell to 27.4 ;* but as the *Seaton* seems to have been in the centre of the hurricane, or nearly so, it is very probable that it fell quite as low as 27.4, or even lower. It is a matter of regret, that the state of the Thermometer was not noted. The hurricane will likely be found to have crossed the Persian Gulf, in about the latitude and longitude of Bahrin.

I subjoin an Extract from the Log of the Barque *Chieftain*, which vessel you will observe was not far from the *Seaton* on the 31st.

29th October.—Lat. 7° 52' N. Long 55° 54' E. Light airs, cloudy weather, sea calm.

* This is without correction for the altitude of the stitum.

30th October.—Lat. 8° 26' N. Long. 56° 46' E. Wind N. E. and by E. Light breeze, cloudy.

31st October.—Lat. 9° 40' N. Long 57° 6' E. Wind N. N. W. and N. W. and by W. Light breeze, cloudy.

1st November.—Lat. 11° 12' N. Long. 57° 15' Wind N. by N. $\frac{1}{2}$ N. to N. W. by W. $\frac{1}{2}$ W. Moderate breeze, cloudy.

2d Nov.—Lat. 13° 5' N. Long 57° 15' E. Moderate breeze, cloudy, heavy head-swell, ship plunging deeply; ship's head N. and by W.; took in the small sails. Breeze moderate, cloudy, dark gloomy appearance, with vivid lightning; latter part squally with heavy rain. P. M. wind W. by N. veered round to W. S. W. and S. W. By this it is evident, the *Chieftain* met the sea occasioned by the same tempest.

The accounts received up till this date, from different parts of the Arabian coast, convey intelligence of a great number of vessels having been lost in the same hurricane. These have been large buggalows, principally belonging to subjects of the Imaum of Muscat, conveying dates, &c. from the Persian Gulf to Aden and different parts of the Red Sea. Fifty-one vessels have been lost to the Northward of Cape Issolleta and between it and Ras-el-had, nine to the Southward of Gardafui, ten between Shabal and Aden; making a total of 70 vessels, the crews in most instances saved.

At Aden, the weather from the 29th October till the 8th November was stormy, cloudy, and unsettled; the tides rose higher than I have known them to do for the last four years; winds from E. N. E. to E. S. E. During this time a heavy sea rolled into the Eastern, Molkut and Bundera-mar bays, which made it impossible for any vessel to have ridden at anchor in either place with any degree of safety. Not having had a Barometer, I cannot say how it was affected; but am of opinion, it indicated the neighbourhood of the hurricane.

The Ship *Maria* left Aden for Bombay two days before the *Seaton*, and arrived at Bombay on the 7th November, having been one month on the passage. An extract from her log shewing her Lat., and Long. and weather met with, from the 29th Oct. till 2nd Nov. would be interesting, and assist in tracking the extent of the hurricane.

I am, Sir, yours faithfully,

JOHN P. MALCOLMSOM,

Surgeon, Political Residency.

Aden, 27th December, 1842.

Before entering on the Summary of the grounds-upon which I have laid down the tracts assigned for this storm in both the accompanying charts, I give for the Bay of Bengal, where we have many ship's logs to consider, a tabular statement. I have not thought it worth while, for the few data which we unfortunately have for its progress over the peninsula and in the Arabian sea, to add these to the table; of which the object is to present with more clearness the corresponding states of the weather over a large extent of ocean at the same time than can be done by the mere descriptions.

Tabular View of the Winds and Weather for the Madras Storm of 23d October, 1842.

Date.	Names of Place or Ship.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Ther.	Simp.	Remarks.
Noon, 21st Oct. 1842.	Brig Waterloo,	NNE. to NE.	° 10 16	° 92 23	..	..	..	{ To Midnight squally and in- creasing.
	AT MADRAS.	Fine.						
Noon. 22d Oct. 1842.	Brig Waterloo,	NE. heavy gale, ...	13 27	90 03	..	..	..	{ The same throughout; Mid- night, wind East.
	Lady Feversham, ..	N. and N. h. W. squally,	12 45½	86 5	..	..	..	Increasing to Midnight.
	Ann Metcalfe,	Moderate, Noon increasing to Midnight from North, ....	..	..	Midt. 29.20	75	..	{ Sea from the North, small rain and thick weather.
	London, ..	To Midnight fresh NE. squalls,	..	..	29.75	..	..	{ Ship standing to the ESE. or towards the Storm.
	Sarah,	1 P. M. breeze from NE. fresh- ening to Midnight,	14 52	83 24	..	..	..
	Stalkart, ..	N. b. E. P. M. NE. increasing and variable	12 10	80 33	..	..	..	High sea from the NE.
	AT MADRAS.	Fine.						
	Favorite,	N. h. E. to Midnight and squally, dark threatening weather, ..	12 12	81 40	..	..	..

Date.	Names of Place or Ship.	Winds and Weather.	Lat. N.	Lon. E.	Barometer.	Ther.	Simp.	Remarks.
Noon, 23 rd Oct. 1842.	Brig Waterloo,	Fine P.M. West South,	° ' 14 45	° ' 88. 55	..	..	..	By Noon all sail set.
	Lady Feversham,	South, furious Hurricane from Midnight to 6 A. M. Noon moderate ESE.	12 04	..	29.70 to 20.40	..	..	At 1½ A.M. dismasted.
	Ann Metcalfe,	4 A.M. gale and Hurricane from the Northward, Noon lulled, P.M. South, Hurricane,	12 0	85. 30	8 A.M. 28.70 Noon 28.50 8 P.M. 28.80 Midr. 29.10			
	London,	Noon strong gale, NNE, and heavy gusts, P.M. NE. 4 P.M. ENE.....	12 56	83. 55	6 A.M. 29.60 Noon 29.70 4 P.M. 29.70			
	Sarah,.....	NE. to NNE, P.M. Noon hove to, increasing gale, 6 P.M. NE.	14 07	84. 24	29.73	..	..	{ Bar. 1 P.M., 29.70; at 2, 29.65; at 3, 29.62; at 4, 29.58; at 6, 29.60.
	Favorite,	NNE. to NEhN. at Noon strong gale; P.M. Nbe. hove to, ..	11 49	83. 35	..	..	..	{ At 10-15 on her beam ends, wind veered between Noon and Midnight to NE. but time not marked.
	Stalkart,	A. M. Hard gales NNE, in- creasing 10 P.M. Hurricane NNW. ..	11 33	80. 58	..	..	..
	MADRAS and Roads,	Strong breeze from North, in- creasing to Midnight. ....	..	..	..	..	..	Heavy swell from NE.

Date.	Names of Place and Ship.	Winds and Weather.	Lat. N.	Lon. E.	Barometer.	Ther.	Simp.	Remarks.
24th Oct. 1842.	Brig Waterloo, ...	Fine,	14 44	86 38	..	..
	Lady Feversham,	Moderate with squalls,	13 16	86 15	..	..
	Ann Metcalfe,	Decreasing from Midnight. Noon moderate, ..	12 6	84 30	4 A.M. 29.20 8 — 29.50	..		
	London,	Veering to SE., moderating at Noon, P. M. ESE. ...	12 34	83 44	29.70 29.50	81		
	Sarah,	Veering; NE to E by S. At Noon strong gales, P. M. SSE.	13 34	83 53	4 A.M. 29.63 8 — 29.73			
	Favorite,	Daylight SE. Noon moderat- ing, P. M. SE by S. ...	11 53	83 35	..			
	Stalkart,	6 A. M. West furious gale, 10 P. M. strong gales South. Midnight fine,	11 33	81 31	..			
	MADRAS,	At Night smart squalls. 8 A. M. NNW. gale thick and heavy. Noon Wind N. to N by E. 2 P. M. NNE, and NNE; at 6.7. E by S. and ESE; at 8. SE. 10 clear- ing up, ..	..	..	8 A.M. 10 — Noon 29.78 2 P.M. 29.72 9 — 29.84	..		Mostly slipped at 9 to noon and stood out East; 3, stood to the SE.
	Ships putting to Sea from Madras Roads, ..	.....	..	..	..	..	..

Note.—The object of this Table being to trace the track of the storm I have not given here (for they offer little or no data for that purpose) the ships which slipped between 8 A. M. and Noon from Madras Roads, which being all in the Northern half of the storm, had all the wind veering gradually from North or N by W. in the Roads to SE. in the offing, and none of them being far enough to the South to meet with the centre. The wrecked ships were partly I think drifted on shore for want of canvas, and partly by the storm wave or storm current, to which I shall refer in the remarks at the conclusion.

Date.	Names of Place or Ship.	Winds and Weather.	Lat.° N.	Lon. E.	Barometer.	Stimp.	Therm.	Remarks.
24th Oct. 1842.	Lady Clifford off Na- gore to Sadras,	Gale from the Westward and WSW.	° ' 11 9 Noon Midt. 12 20	° ' 80 10 80 55	Noon 30.60	..	..	{ Bar. from 29.90 to 30.00: at Noon 29.70; at 5 P. M. and 29.90 at Midnight. Pro- bably too high.
	Pondicherry,	10 A. M. NW. to WNW. squalls, 4 P. M. violent Hurricane, 5 P. M. NW. to WNW. and calm when renewed from SW. to South, at 9 P. M. SE.	11 59	
	Porto Novo,	Fresh gales NW. 6 P. M. shifted to SW. at Midnight South.	11 31					

Summary.

It is evident enough, that this storm was one coming in upon the Coromandel coast from the Eastward and it will be observed by our charts, that we have secured, through Captain Biden's zealous assistance, a chain of vessels, (which almost appear as if *stationed* there) from the Andamans to Madras; every one of which experienced the commencement of the storm before it terminated with the vessel to the Eastward of her; and every one of which had the winds and shifts of wind exactly as they *should* have them upon the supposition of a great whirlwind, rotating from left to right, or by S. E., N. W.* and moving at the same time forward, *and these winds, and shifts of wind, and successive storms can be explained by no other theory!* If the Law of Storms for the Northern hemisphere was yet to be demonstrated, it could scarcely be so more completely than it has here been: I begin of course with the vessel farthest to the Eastward.

This is the *Waterloo*, which on the 20th October at noon was passing the Southern extremity of the Andamans with fine weather, and from thence steering to the N. W., with fresh N. N. E. breezes. On the 22nd October, we find her at noon in lat. $13^{\circ} 27'$ N. and long. $90^{\circ} 03'$ E., being then three degrees to the Westward of the Andamans, and ten degrees to the East of Madras, with heavy gales from the N. E. which had increased from the midnight preceding; and by midnight of 22nd to 23rd, when she had made about a degree to the Northward and Westward; and when the storm, if it then existed as a circular one, had also travelled to the Westward: the wind was at Eastward moderating. We have no Barometer marked, but this change is that which a rotatory storm would give, and which a mere monsoon gale would scarcely do. I take it therefore, that at noon on the 22nd, the centre of this storm was about 120 miles to the S. E. of the *Waterloo's* position. I have carried the line marking the track from the direction of the Andamans, and if we take the increasing breeze of the 21st to have been part of the storm, the centre will for that day fall to the Eastward of these Islands; but we have too little authority I think, to assign it any place for the 21st.

* This is Professor Dove's description of the rotation, and as it is better than ours I use it here, and shall use it in future.

On the 23rd, the *Waterloo* had fine weather, having stood to the N. W., and the wind at noon South and S. Easterly, being altogether out of the reach of the storm; another proof also, that her gale of the preceding day was part of a rotatory, and not a monsoon gale.

The *Lady Feversham*, which is the next ship to the *Waterloo*, was at midnight on the 22d-23rd about 220 miles to the S. W. by W. of her, and about on the latitude of the track of the storm; she had the wind increasing so rapidly from the North and N. by W. from noon to that time, that at 11 P. M. 22nd, it was blowing a gale, and at 1-30 A. M. of 23rd, a complete hurricane, so that she was just enveloped in the hurricane when it had entirely left the *Waterloo*. At 1-45 A. M. of the 23rd she was "dismasted, and at 2-45, the calm centre reached her. At 3-30, the hurricane is stated to be with her at its greatest force; her Barometer being at 28.30, from which time it moderated, till at noon it is called a strong wind at E. S. E.

The *Ann Metcalfe* is the next vessel, and with her it is not called a hurricane till 8 A. M., or about 8 hours later than with the *Lady Feversham*: and with the *Metcalfe* the calm took place at noon, giving thus pretty nearly the centre for noon that day, which also agrees with the log of the *London*, which had "a strong gale" at N. N. E. at this time, and generally with those of the *Favorite*, *Sarah*, and *Stalkart*.

These data are all good for the centre of the storm for the 23rd in about lat. 12° N. long. $85^{\circ} 30'$ E. which is also given (evidently in such weather an estimated one) as the position of the *Ann Metcalfe* at noon.

There are, in adopting it as the centre, two slight discrepancies to be noticed; the first, that though it is only 45 miles to the Westward of the *Feversham's* position, that vessel at noon had the weather moderating fast, and wind from E. S. E.; the second, that the direction of the wind with the *Favorite* (N. N. E.) if her position is right, would place the centre further to the Southward, and the last, that though almost fine with the *Feversham*, it was beginning to be felt as a gale by the *Sarah*, which was at 145 miles of distance from this centre.

We cannot, however, take upon ourselves to alter the estimate of a vessel's position, though the storm wave and storm currents must have carried some of the vessels much beyond or within their estimated

drifts. It is probable, that as the *Feversham* had no observation, she may have been in error.* The whole difference which these considerations make is not much, but I note them to shew that nothing is overlooked. Are they to be accounted for by the theory that the progressive motion of a rotatory storm, particularly when as in this case it is a rapidly moving one (12 or 13 miles an hour) tends to generate the rotatory motion farther before it? We know so little of how they act, that this supposition is at least worth mentioning. Most accounts of storms seem to agree in this, that the force of storms and the rise of the Barometer are greater and more rapid than their increase or its fall. I have marked on the chart, the spot where the *Washington* foundered on the 25th. As she had the hurricane from the Eastward, she was to the Northward of its track, and must have drifted up after it was over with the S. Easterly winds, which we see the *Lady Feversham* had, and which indeed seem usually to follow the N. E. quadrants of the storms, and sometimes their S. E. quadrants also. The ship seen by the *Washington* was probably the *Lady Feversham*, which had only a foremast left standing, though this last vessel's log does not mention any other vessel in sight; but when all hands are busy rigging jury masts and pumping, the look out is rarely attended to. The *Washington* in her sinking state, was no doubt most anxiously looking for ships.

We have now to consider the probable place of the centre at Noon on the 24th, which day it will be recollected is that of the storm's reaching Madras and Pondicherry. At Madras the veering of the wind N. N. E. by N. E. and East to S. E., with fine weather, shews clearly enough, that the centre passed to the South of that place, while the veering of the wind at Pondicherry from N. W. by the West to S. W., shews also, that it passed close to the Northward of that settlement; the short calm interval noted in the reports being the time of the passage of the centre. This is stated to have been at 20 minutes past 5.†

* See concluding remarks.

† The lowest depression of the Barometer at Madras is stated to have been at 4 P. M. 29.704; it seems to have been 4.45, P. M. before the wind was at East, but as I have already explained before, the direction of the wind varies much on approaching the land.

Now from Noon 23rd to half-past 5 of the 24th is $29\frac{1}{2}$ hours, and the distance between the place of the centre on the 23rd and Pondicherry is 385 miles, which divided by $29\frac{1}{2}$, gives about 12.4 miles per hour. In the $5\frac{1}{2}$ hours from Noon, the centre would at this rate have made 68.2 miles, which gives the distance of the centre, bearing about West from Pondicherry at Noon on the 24th or in lat. $12^{\circ} 2' N.$ long. $81^{\circ} E.$

We have now to trace the storm inland, and for this purpose our materials are the letters and reports from Ryacottah, Bangalore, Bellary, Salem, Madura, Paumban, &c., and from Cochin and Tellichery, on the Western coast. For these we are indebted to Capt. Campbell, of the Revenue Survey; to Capt. Newbold, Assistant Commissioner of Kurnool, whose able remarks I have placed in the Summary; to Mr. Crozier, Sub-collector of Madura; Mr. Bruin, Magistrate of Mangalore, and Mr. Bourgoin, Governor of Mahé, and my readers will now please to refer to Chart. II. Ryacottah is in Lat. $12^{\circ} 31\frac{1}{2}' N.$ Long. $78^{\circ} 5' E.$, and its bearing and distance from our centre of the 24th is about W. b. N. 184 miles, and we find that by 4 p. m. of the 24th it was blowing strong at North. By 9, it was blowing in doors and windows, so that we may take it fairly to have begun as a gale at North at 6 p. m. on the 24th; and as by $3\frac{1}{2}$ a. m. on the 25th, the wind was at East with the Barometer at 29.636, its lowest depression, we may assume that the centre was now on or near the meridian of this place, at say 60 or 80 miles distance; for we see by Capt. Newbold's letter, that it was felt severely at Salem from the N. E. (time not mentioned,) which shews that its centre, taking it to be then a circular storm, was yet to the South of that station, and that it was *not* felt at Madura, 104 miles South of Salem, or 154 of Ryacottah. In estimating the position of it, we may take this spot to be also at the same distance from our centre of the 24th (already laid down) as Ryacottah itself, or 184 miles, or about in the latitude of Porto Novo; so that we have the storm travelling from Noon 24th to $3\frac{1}{2}$ a. m. on the 25th, or in $15\frac{1}{2}$ hours, 184 miles, or 11.9 per hour, our former rates being 12.4 miles per hour, a less retardative rate than we have hitherto found in former storms.

* Salem is about 50 miles S. by E. of Ryacottah.

Taking this rate, we may carry it farther on from $3\frac{1}{2}$ A. M. to Noon of the 25th May, which will give us, taking it to have passed on a nearly W. S. W. course, but curving as it passed Pondicherry, so as to form an arc, $8\frac{1}{2}$ hours at 11.9 per hour, or about 100 miles beyond the meridian of Ryacottah, if it still moved at the same rate, though of this we are not certain. This calculation would place the centre at Noon 25th in lat. about $10^{\circ} 30'$ long. $77^{\circ} 00'$ E. or about the head of the Paulgatcherry Pass on its South side, as supposed by Captain Newbold in the extract which follows in the next page.

We next find that according to the extract from the Bombay paper, the *Seaforth*, Ceylon steamer, encountered the storm at 10 P. M. on the 25th off Cochin. I have only this brief notice of this vessel's log, and thus we cannot say if she encountered its Northern or Southern half, or its centre; but as the track of the storm certainly trends to the N. Westward in the Arabian sea, as we shall see by the subsequent logs of the *Lucy Wright*, *Futtay Salam*, &c. we may say that it was in all probability the centre or the Southern half of the vortex, which the *Seaforth* met with. If we take her to have been 60 miles from the coast, which in the dangerous month of October is not an excessive offing, this would give, from our centre before mentioned a distance of 110 miles in 10 hours, or 11 miles an hour, or nearly its former rate. It must be recollected, that if the *Seaforth* might have been much closer in shore, the storm also might have been much retarded by the steep escarpments of the pass; and all we wish to shew is, that there is connection enough between its rates of travelling, and the times at which it was felt in various places, to enable us to pronounce, on fair and reasonable, if not on positive grounds, that it was *the same* storm throughout.

Before tracking it farther at sea, I shall give here Capt. Newbold's highly interesting views as to the passage of the storm over the peninsula.

“ From the physical configuration of the country to the North, West, and South of Madras, it strikes me that any aerial current coming from the Eastward, would be directed from its progress in a direct Westerly direction by the high line of the Eastern Ghauts, and turned in a South-Westerly direction by the break of Salem, whence sweeping across the plains of Coimbatore at the Southern base of the *Koonda* and *Nilgherry* escarpments, it would be concentrated on that singular gap

in the Western Ghauts—the Paulghautcherry pass, whence it would make its escape Westerly to the Indian Ocean in the direct latitude of the Laccadives. I enclose you a small map, of which I beg your acceptance, on which I have marked by arrows, the probable direction of the Madras storm,* which if it be the identical one that visited the Laccadives, must have pursued this course, and have been felt at Arcot, Vellore, Salem, Darapooram, Coimbatore, Paulghautcherry and Paniani, on the Western coast, the appropriate situation of which I have marked in ink on the map. It will be also seen, that currents of air, blowing Easterly across the peninsula about the latitude of Madura, and winds blowing Westerly about the latitude of Cochin or Alleppe, must be diverted Southerly by the Western Ghaut ridge to Cape Comorin, a circumstance which may account for the gusts experienced off this Cape during *both* monsoons. Winds blowing from the W. in the latitude of Paniani and N. of it, Calicut, Tellicherry, and Cannanore perhaps, would be deflected by the Ghaut barrier Southerly, in the direction of the arrows on the map marked B. to the great gap of Paulghautcherry, and thence rush through it Easterly on the plains of Coimbatore and Salem.

“ The exact points where the winds are thus deflected, their minute variations of current, with their various minor influencing causes, are still matters of interesting research and a meteorological desideratum: but that they are deflected as I have described on the grand scale by the Ghaut lines of elevation which constitute the main features of the physical contour of Southern India, there can be little doubt. It is a well known fact, that where these ridges attain a certain height, neither the North-East nor South-West Monsoons usually ascend above them. I was crossing the Eastern Ghauts at the time of the storm at Madras a little S. of the latitude of Nellore, and observed an enormous mass of irregular clouds rise from the Eastward, and advance rapidly on the mountain; here the great bulk was arrested, and (collected by electric attraction?) into a long, horizontal, wall-like bank, of solid aspect and of a deep bluish hue, varied at the edges by flocculent curves and zones of sombre grey, which appeared in vivid distinctness, as ever and anon coruscations of lightning shot up and illumined portions of the gloomy mass. In height and contour, they assimilated the mural barrier opposed to them. They remained in this sullen form apparently motionless for a day or two, when they gradually dispersed. There was little wind in the sheltered valley along which I travelled, and that little variable. A few detached higher clouds escaped and passed slowly to the Westward, while portions of the upper edge of the cloudbank would sometimes curl over the top of the ridge, like the falling crest of a wave dispersing in spray, and descend in a transient shower on the Western slopes. An almost similar phenomenon is presented on the table lands on the

* I have copied in my Chart No. II, as much of the chain of Mountains as relates to our present subject.

West flanks of the Eastern Ghauts on the commencement of the N. E. Monsoon.*

“The almost effectual barrier presented by the Eastern Ghauts to the force of the N. E. monsoon is a proof, that this great aerial current is confined, generally speaking, to the lower strata of the atmosphere. The same may be perhaps said of the Madras storms, which generally travel from the East. Though often *commencing* from the N. and N. W., the current from the East first striking the Ghaut line to the N. of Madras, that city thus receives this deflected Southerly current previous to the arrival directly of the main body from the East. The foregoing remark, of course, you must apply with much modification to the *true whirlwind storm*, which owes its vortical movement to far different causes. The *average* height of the Eastern Ghauts N. of Madras is about 1,500 feet.

“Places situate on the table lands *East* of the *Western* Ghauts experience still less of the S. W. Monsoon (the heavier of the two,) than the tracts sheltered by the Eastern Ghauts from the N. E. Monsoon. This is ascribable to the greater *average height* of the former, (3,000 feet above the sea,) and to their more continuous character as a mountain chain. The almost only exception to this remark arises from a remarkable opening in them; viz. the gap of Paulghautchery, which I have already alluded to as the probable route by which the Madras storm found its way across the peninsula to the Laccadives. It may be as well here to state in corroboration of this supposition, that it is well known (Madras Almanac 1840) that ships navigating the Malabar coast during the *N. E.* Monsoon, commonly experience a stronger gale in the neighbourhood of Paniani than elsewhere; and this break in the Ghauts appears to be the cause of this effect.†

“During the S. W. Monsoon, the Westerly wind, which sweeps through this pass from the beginning of June until about September, is extremely violent at Darapooram and other places to the Eastward in a line with its longitudinal axis, as its influence is felt even farther East than Trichinopoly; but at other places a little N. or S. of the line of the pass, the current is hardly perceived. The pass is from 16 to 20 feet wide, narrower at the E. than at the W. extremity: lofty rocks of the Koondah and Nilgherry chains on its Northern, and the Palghaut groups on its South flank—its surface is pretty level; the slope from the plains of Coimbatore to those on the coast so gradual as to be almost imperceptible; the height of the pass above the sea about the centre (roughly approximated by means of the boiling point of water) is 900 feet.

“I will write to Salem for such information as I can procure.”

* We are forcibly reminded here of the Devil's Table Cloth preceding a S. E. gale in Table Bay.—H. P.

† This is confirmed by Horsburgh, and the experience of all navigators in that sea

The foregoing views it will be seen, by those who have followed the series of these memoirs, are exactly analogous to those advanced in my first memoir, where I have given a chart illustrative of the deflection of the S. W. Monsoon, by the mountains on the coast of Arracan, from Cape Negrais Northwards, by the Cachar and Bootan ranges, till, by those of the Himalaya, the S. W. Monsoon for a part of its duration is converted into a stream of Easterly winds. There can also be little doubt, that as Capt. Newbold remarks, the winds and hurricanes rarely extend to any great perpendicular height, and are thus constantly subjected to all the deflections and interruptions which hill and mountain ranges occasion.

We have now, having I think, shewn satisfactorily that the storm was identically the same with that of Madras (?) to follow it in its course in the Arabian Sea ; and our next document is, (not neglecting to note the fall of the Barometer at Bombay, from the 25th to the 29th as we proceed,) the notice of the dismasting of the *Lucy Wright*.

This vessel was on the 27th, when the height of the storm occurred with her, in lat. $13^{\circ} 2'$ N. long. $71^{\circ} 39'$ E. This spot is distant 340 miles from that at which we have placed (by estimation only) the centre of the storm on the 25th at Noon at the head of the Paulghautcherry Pass, and we know that while it was raging at sea with the *Seaforth* ten hours later, it was not felt, though there were clear indications of it, to the experienced native craft and fishermen, and these would doubtless have been much more distinct with the assistance of a Barometer and Sympiesometer, at Tellicherry and Mount Dilly, 100 miles to the North of the *Seaforth's* position. Our reports from Mahé and Karical also confirm this ; but again at Mangalore we find on the 25th, strong gusts of wind from the N. W., as if there was then a commencement of a storm hereabouts, the original one having separated into two by the various obstacles it met with. It is, however, just possible, that these N. W. gusts were nothing but parts of the storm pouring over the Western Ghauts. The *Higginson*, 75 miles West of the *Lucy Wright*, had a heavy gale for 6 hours from West to South on the 28th, and must have been therefore in the S. E. quadrant of it ; the centre being thus to the N. W. of her, and having passed nearest to her, and to the Northward, at 6 A. M. of the 28th,

as would appear by the fall of her Barometer. We do not know how the *Lucy Wright* had the wind, so that we must take the *Higginson's* datum as the nearest and most detailed, and *her* account, with what we have already remarked of the limited extent of the storm off Cochin with the *Seaforth*, which excludes the supposition of these storms being the same, may allow us to assume, for we can do no more, that at 6 A. M. on the 28th, the centre of a storm was, say 40 miles or less to the North of her, and that her Easterly and N. Easterly drift with a Westerly and South-Westerly gale brought the wind to South, which it might quickly do when on such a small circle.

We know only of the *Lucy Wright*, that she was dismasted the day preceding, but in what part of the storm, or where she may have drifted to by this time, 6 A. M. 28th, we are quite ignorant. I have therefore not marked any circle for her on the 27th,* and though it is certain that, as we shall presently see there were two storms, we do not know their tracks hereabouts.

But we now find by the *Futtay Salam's* log and track, that she had been running to the N. by E. from about lat. 8° to lat. 12° , and between 68° and 69° E. till midnight of the 26th, when she evidently plunged into the circle of a storm on its S. E. quadrant, as she had then a gale from S. W. which increased to a hurricane from S. S. W., South, and S. East, moderating again a little by midnight of the 27th-28th; so that she may be taken, from midnight of the 26th to midnight of the 27th, or for 24 hours, to have been drifting, and pretty close to the centre, across the S. E. quadrant of a storm, of which the centre was of course brought successively to the N. W., West, and S. W. of her, as it progressed and the vessel drifted.

Now if we consider this with the chart and log before us, we may fairly allow, that at Noon of the 27th, the centre of the *Futtay Salam's* hurricane bore from her about West, 30 or 40 miles, or was in lat. $12^{\circ} 00'$ N. lon. $68^{\circ} 20'$ or 30° E., and I have from that point struck a circle to shew it. This circle will also shew, *that this storm and the*

* There is a considerable degree of uncertainty about all newspaper extracts relating to storms, on account of the errors with which, even in the best printed ones, these accounts always abound. Mr. Redfield I think alludes to the same circumstance, as much diminishing the value of newspaper notices.

Higginson's could not have been the same, for the *Higginson* being bound to Bombay, must have been on the 27th, (unless she lost ground between that and the 28th,) somewhere to the Eastward of her position on the 28th, which would place her on, or not far from the meridian of the *Futtay Salam's* storm, where she would first have had the wind from N. E. East or S. E., being in its Northern half; whereas she had it "from West to South," or was in its *S. Eastern* quadrant like the *Futtay Salam* on the 26th; and if on the 27th at Noon, the *Futtay Salam's* hurricane be supposed to reach to the *Lucy Wright's* position, and have been there violent enough to dismast her, (at a distance of 180 miles from its centre,) which is very improbable, this would *a fortiori* have given the *Higginson* an Easterly or E. S. Easterly hurricane on the 27th; when it is apparent that she had fine weather; for it was evidently not then even threatening enough to be mentioned in her log. She was, as I before said, bound to Bombay, and must therefore have been coming from some point between S. and N. W., and this would always have given her bad weather from some quarter on the 27th, as would also any track we can suppose for the storm. Hence it is clear, that the *Futtay Salam's* hurricane and the *Higginson's* storms could not be the same; as the *Lucy Wright's* and *Higginson's* might have been so, the one being dismasted on the 27th, and the other meeting a storm as she came from the Eastward on the 28th. In the absence of further information then, I suppose that there were here, as we have found before where the track of a storm crosses, or makes a considerable angle with the prevailing Monsoon, two storms.* Of these I take the *Lucy Wright's* and *Higginson's* to have been the smaller one, and the *Futtay Salam's* and *Seaton's*, which we must now consider, to have been the greater and more direct one.

The *Seaton's* storm it is clear from the shift of wind was a severe hurricane travelling from the E. by S. or E. E. S. to the W. N. Westward. I have marked the Lat. and Long. at which it first struck her, and that to which she might have drifted between, say 6 A. M. on the 31st and 6 A. M. on the 1st with a N. N. Westerly gale, drifting

* The probability of two storms is much increased, as far at least as mere dynamical forces and interruptions go, by considering how many currents our storm must have created in its passage over the Ghauts, and the interval of threatening weather only along the coast under the line of the Ghauts.

before it at the rate of $3\frac{1}{2}$ miles per hour, the least which we can allow for a disabled ship. This brings her to lat. $12^{\circ} 36'$, long. $60^{\circ} 38' E.$ as the spot where the centre passed her.

We have from this point then, which is tolerably well ascertained, and which the storm reached at 8 A. M. on the 1st November, the following data in time and distance.

	Distance.		Time.	
	miles.	days.	hours.	
To the centre of the <i>Futtay Salam's</i> hurricane, Noon 27th October,	480	4	18	
			or 114 h.	
			or 4.2 per h.	
To the centre of the 25th at Noon, near the Palghautcherry Pass,	990	6	18	
			or 162 h.	
			or 6.1 per h.	
To the centre of the 24th to the Eastward of Madras.	1230	7	18	
			or 186 h.	
			or 6.6 per h.	

The mean of this is 5.6 per hour, or only one-half of what we allowed it to have in crossing the peninsula, and less than half of what we have proved it to have had in the Bay of Bengal; but then we must not forget, first, that it had to force its way over the peninsula, and through 900 miles of distance in the Arabian Sea against the S. W. Monsoon; next that these sort of calculations and allowances always assume some initial force or rate of motion; and lastly, that we know absolutely nothing at all of the *cause* either of the rotatory or progressive forces, or of their opposing resistances and retardation, or if they acquire, or have under any, or what, circumstances, the power of increasing the velocity of either of their motions.

Of all these things, and of much more which will readily occur to men of science, we are profoundly ignorant, and as I have before said, all we can now do is to register accurately, and deduce—when we must deduce—doubtingly.

The log of the *Chieftain* is the only one which now remains for us to remark upon, and it will be evident that she was on the 2nd November just far enough within the verge of the vortex to feel the sea, and have the threatening appearances with the wind veering as it would

do on the southern half of a storm, as the vortex passed on ahead, and to the Northward of her. Her position when compared with that of the *Seaton* at 6 A. M. on the 1st, shews that the track of the storm was now tending to the N. W., and we find accordingly by Dr. Malcolmson's account, that it was severely felt on the Arabian Coast, and that there were some indications of a storm at Aden. We cannot, however, upon such vague accounts, pretend to track it any farther. I grieve to add that; to the disgrace of those who may deserve the blame; neither the log of the *Cleopatra* or of the *Semiramis*, both Government steamers, have been obtainable; I have strong suspicions that both ran headlong into the storm circles. Is the Government of Bombay aware that a mistake of this kind might cost it a steamer, or at least half of a lac of rupees of damages?

Conclusion.

I mention with some satisfaction here, not only that this is the first storm which we have tracked in what must soon be the great highway between England and India, the Arabian Sea, but also that we again find confirmed the law which my previous researches have shewn to hold good for the China Sea and Bay of Bengal, *i. e.* that the storms always come from the Eastward, and travel to the Westward, and it is gratifying to have now ascertained this, with some trifling intervals over 60 degrees of longitude, or one-sixth of the circumference of the globe. As public attention is gradually drawn to this important subject, we may hope that, ere long we shall at least be able to trace the storms of this great, and to us most important division of the Ocean, with as much accuracy as those of other parts of the Eastern Seas.

I must not omit also to point out an important practical lesson for the navigator on the Coromandel Coast, which should not be omitted, and it is this. Those who have studied this subject, and are acquainted with the publications of Reid and Redfield relative to the storms of the Western hemisphere, and with my own relative to those of the Eastern hemisphere, are well aware of the abundant evidence which exists (and there is much more yet unpublished,) to prove the existence of "storm waves" and "storm currents."

To those, however, who are not fully acquainted with the subject, I may say, that the "storm wave" is a mass of water of greater or less diameter according to the storm, raised above the usual level of the ocean by the diminished atmospheric pressure and perhaps other causes, and driven bodily along with the storm or before it, and when it reaches bays or river mouths, or other confined situations, causing by its further rise when contracting, dreadful inundations; but upon open coasts rarely so, or not in so great a degree, as it can there spread out quickly and find its level.* The "storm current" may be briefly described as circular streams on the circumferences of rotatory storms, and of this also we have evidence enough for the mariner at all times to admit, and be on his guard against the *possibility of*, or even the *great probability of*, them.

We have thus in every storm two sets of forces (currents) independent of that of the wind, acting upon a ship; the one carrying her bodily onward on the track of the storm, and the other drifting her round the periphery of that part of the storm circle in which she may be.

Taking, as the simplest case, and one nearly that of Madras Roads, a storm travelling from East to West, and striking upon a Coast running North and South, its centre passing over Pondicherry, we should have then, for all ships in the offing, one current, "the storm wave" carrying them directly on shore, with greater or less velocity, as they were nearer or farther from the centre; and other currents, "the storm currents" varying in their direction according to the situation of each ship in the storm circle, but always agreeing pretty nearly with the direction of the wind.

The current of the storm *wave* then is setting due West, but that of the storm *current* West on the North side of the storm circle, and due *East* at its South side; South at its Western edge, and North at its Eastern side, and so on in all the intermediate directions; and a ship putting to sea from Madras roads in our supposed case, will be carried right towards the shore by the *storm wave*, and to the S. Westward also by the *storm current*; but if putting to sea from

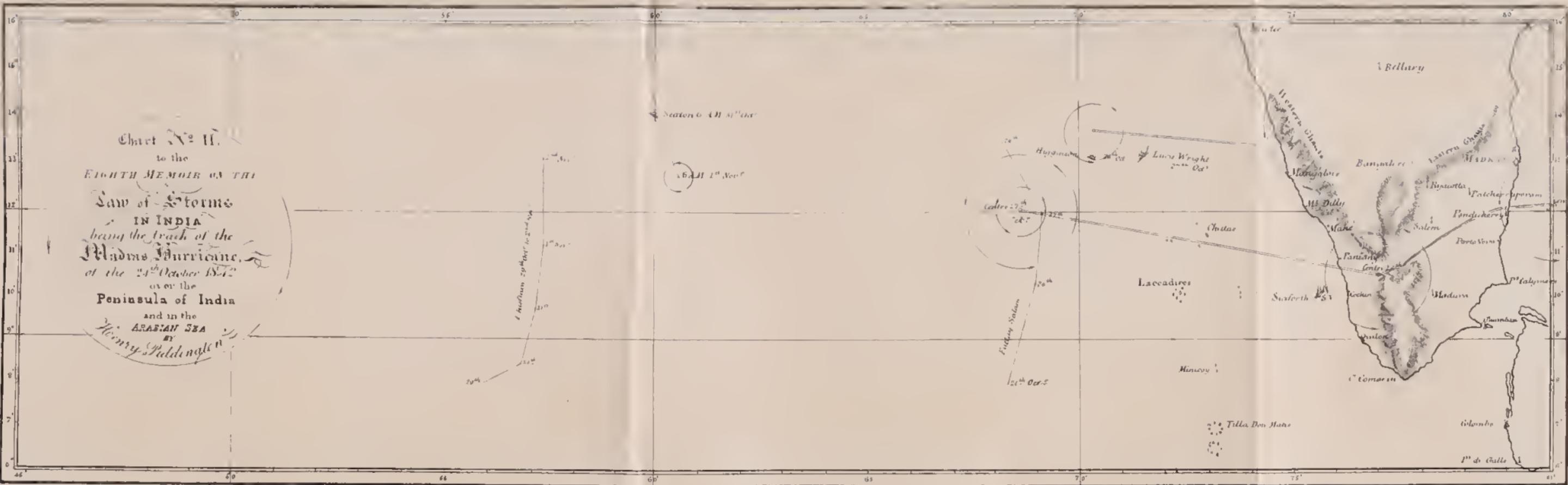
* The deep sea wave also, (the *flot de fond* of the French writers) no doubt assists the inundation; but as this is not a surface cause, I do not allude to it.

Chart
 To THE EIGHTH MEMOIR
 on the
Saw of Storms
 IN INDIA
 Being
The Madras Hurricane
 of 24th October
 1842.
 By Henry Hallowell.



1842. Printed by W. G. & Co. Madras.

Chart No. II.
 to the
 EIGHTH MEMOIR ON THE
 Law of Storms
 IN INDIA
 being the track of the
 Madras Hurricane,
 at the 24th October 1842
 over the
 Peninsula of India
 and in the
 ARABIAN SEA
 BY
 Henry Piddington



any place to the Southward of Pondicherry, she would be carried one way by the storm wave, and the opposite one, or partly so, say to the S. E., East, or N. E.: by the storm current ; so that as to mere Westing, the effect of the one would probably neutralise that of the other. The case of ships on the Northern half of the storm, where both forces are against him, should however be borne seriously in mind by the seaman. It was probably the cause of the indraught which wrecked the ships which were lost in this storm, and of some of the others finding themselves in much shoaler water than from their run, they might reasonably have supposed. Captain Biden's suggestion in the port orders, to keep a due attention to the lead in these cases is then founded not only on merely sound nautical experience, but upon good scientific grounds also. To neglect the lead is a positive act of barratry or folly, for in these storms it is impossible to estimate the true distance from the coast by any other means, and the three forces, the " storm wave," " storm current," and the drift occasioned by the wind, would form a complex problem in fine weather. The seaman will not fail to recollect how much influence the storm wave may have upon his position in places where, as in the British Channel,* a storm coming from the Westward, brings with it a vast mass of water from a great Ocean like the Atlantic, so that with a Southerly or South-westerly gale, he finds himself set far to the Eastward by some hitherto unknown but fatal current: and I trust that when I say that, if we can obtain documents, we may trace out accurately the laws of these dangerous complications, I shall add another claim to the assistance of every right minded seaman, and of every friend to humanity.

* I allude here, it will be perceived, to the two recent and harrowing catastrophes of the *Reliance* and *Conqueror*. In both these cases the gale being Westerly, the vessels were on the Southern half of the storm circle, and had thus both the storm wave and storm current carrying them far to the Eastward of their reckoning.

Translation of the Nairāliya Devata Kalyāna, with Notes. By B. H. HODGSON, Esq. Resident at Kathmandoo.

1. May the first born, the holy Swayambhu, Amitaruchi, Amāgha, Akshobhya, the splendid Vairo Chana, Manibhava, and the supreme spiritual preceptor Vajra Satwa preserve us in all our journeyings and in all our abidings: May Prajna, Vajradhātvi, the all-bountiful Arya Tārā, and the rest be propitious to us. I adore them.

I. Fully to explain the substance of the stanzas comprised in this little manual, would require a comment ten times as large as the text: I must therefore content myself with simply announcing a few of the general principles of Buddhism, which may serve to connect the sense of the stanzas, leaving the exposition and proof of those principles to a future occasion, if not, to more competent ability. Buddhism, as it is to be found not only in the recent writings and present practise, but also in the very ancient Bouddha scriptures of Nipal, recognises a theistic, as well as an atheistic, system of the universe. According to the former, from an eternal, infinite and immaterial Adi Buddha proceeded, divinely and not generatively, five lesser Buddhas, who are considered the immediate sources (Adi Buddha being the ultimate source) of the five elements of matter, and of the five organs and five faculties of sensation. The moulding of these materials into the shape of an actual world is not, however, the business of the five Buddhas, but is devolved by them upon lesser emanations from themselves denominated Bodhisatwas, who are thus the tertiary and active agents of the creation and government of the world, by virtue of powers derived, immediately from the five Buddhas, ultimately from the one supreme Buddha. This system of five Buddhas provides for the origin of the material world, and for that of immaterial existences, a sixth Buddha is declared to have emanated divinely from Adi Buddha, and to this sixth Buddha, (Vajra Satwa by name,) is assigned the immediate originization of mind, and its powers of thought and feeling. The five, as well as the six Buddhas, are constantly invoked collectively under the names of the Panaha and Shata, Buddha and Ratna. All these Buddhas are often styled Ripopadaka, Manasi and Dhyani, titles which would seem necessarily to distinguish them, not only from the mere mortal Buddhas of the Swobhavika sect, but also from *any* generatively produced beings. Nevertheless in the first stanza of this manual (no very good authority) a sakti or spouse is assigned not only to each of the five Buddhas, but also to Adi Buddha himself: and I suppose therefore that with respect to these Bouddha goddesses of the Aishwarik, as we must adopt the fantastic theory of the Vedantika Brahmanists, and consider them mere nominal deities; until we can assert (as I think we shall soon be able to do) that the theory of Sakties is a modern corruption of Buddhism derived from Brahmanism. I am aware that the Swobhavika Saugatas typify the innate powers of matter by a Goddess, but this is a notion totally different from the assignation of a female medium of activity to creators working declaredly by volitions, or (as the Bouddhas phrase it) by Dhyānas: and such is the statement which I have found in respect to the "Pancha Buddha" of the Aishwarikas in works of higher

authority than the Kalyána. But to return to my text, from which I have unwittingly too far deviated; the invocation of the first stanza is first, to the supreme Buddha, next to the six Buddhas, (whose more familiar names will be found below,) then to the Sakti of Adi Buddha, and lastly to the Sakties of each of the six Buddhas. The names of these ladies are as follow: Adi Buddha's Prajna, Vairo Chana's Vajradhatweswari, Akshobhya's Lochana, Ratna Sambhava's Mámukhi, Amitabha's Pandara, Amogha Siddha's Tára, Vajra Satwa's Vajrasatwatmika.

2. May the Goddesses Sampatprodá, Ganapatihridayá, Vajravidrá-vini, Ushnishá, Parna, Kitivaravadana, Grahamátriká, Kotilákshi, and the Pancharakshá be propitious to us. I adore them.

2. The distinction of Swobhavika and Aishwarika Buddhists has already been alluded to. There is another division into exoteric and esoteric doctrines. The goddesses invoked in this stanza belong to the esoteric system, and to the Swobhavika school: for they are all said to have been produced from Swobhava "each with her own Vija Mantra." It may be proper here to observe that the Swobhavikas do not deny intelligence, but immaterial entity. They insist that those powers which others say were impressed on nature by the God who created nature are proper to matter itself which alone is; and which is eternal, not in its palpable individual forms, but in its impressable elements. They add that nature produces not only man but superior beings, (though none with such a plenitude of power as man is *capable* of attaining,) and amongst these beings are the goddesses invoked in this stanza. The more familiar, and (as it were) *proper* name of Sampatproda is Vasundhara, of Kitivaravadana is Marichi, of Kotilakshi is Pratingira, and the names of the five Rakshas are Pratesara, Máhasahásrpramurdini, Máha Mayari, Maha Setavati and Máha Mantranusarini.

3. May Ratna Garbha, Dipánkara, the Jina Manikusama, Vipasyi, Sikhi, Viswabhù, Kakutsat, Kanaka Muni, Kasyapa, and Sakya Sinha: may all the past, present and future Buddhas, whose excellence exceeds the bounds of the ten faculties be propitious to us. I adore them.

3. The objects of invocation in this stanza are ten Manushi Buddhas. The seven last are the famous "Sapta Buddha," and I doubt the propriety of associating any other to them. I am told that the Karana Pundarika assigns these 10 Buddhas to the four yugas, giving the three first named to the Satya, an idle story, or at least a legend contradicted by higher authority, such as that of the Sambhu Purana, which makes Vipasyi and Sikhi the Buddhas of the satya yuga.

4. May the first of the Bodhisatwas named Avalokeswara, may Maitreya, Anauta Ganja, Samantbhadra, Kshitijathara, Kbagarbha, Sarvadyonevarakhya, Kulisvaradhara, and the great Manja Natha be propitious to us. I adore them.

4. Nine Bodhisatwas are invoked in this stanza, for all of whom the commentator claims a celestial origin and parentage, as follows:—

Aryavalokeswar,	..	..	..	Son of Amitabha.
Maitreya,	..	..	..	ditto ,, Vairo Chana.
Gagan Ganja,	..	..	..	ditto ,, Akshobhya.
Vajra Pani,	..	..	..	ditto ,, ditto.
Manja Natha,	..	..	..	ditto ,, ditto.
Samanta Bhadra,	..	..	..	ditto ,, Vairo Chana.
Kshiti garbha,	..	..	..	ditto ,, Ratna Sambhava.
Kha Garbha,	..	..	..	ditto ,, Amitabha.
Sarvani Varana Viskambhi,	..	..	..	ditto ,, Amogha.

In this enumeration the more familiar names of the Bodhisatwas are preferred to those of the text. This commentator was doubtless an Aishwarika Bauddha, and a recent one who, according to the prevalent modern fashion has resolutely assigned a heavenly origin to Bodhisatwas of mortal mould. The first (who is the same with Padma Páni,) fourth and sixth are notoriously celestial sons of the Divine Buddhas to whom they are assigned, but the others, and especially Manjnath, are doubtless of mortal origin, and historical personages.

5. May that light which, a proportion of himself, the supreme Buddha caused to issue from the lotus that sprang from the seed planted in Nagavasa by Vipasyi, and which, (light,) itself one, became five-fold in the five Buddhas for the preservation of mankind, be propitious to us. I adore it.

5. Here the object of invocation is to the Jyoti-rup-adi Buddha of Sambhu Nath mountain, a portion of the supreme Buddha revealed in Nipal in the form of flame. The legend is to be found in the Sambhu Puran, but is too long for insertion here. It is said by the Bouddhas of Nipal, that the ever-during flame still burns in the centre of the hemisphere of Sambhu Chaitya.

6. May that mysterious portion of Prajna, born of the lotus with three leaves in the form of Guhyeswari, made manifest by Manja Deva, void of form, the personification of desire, favourable to many, the giver of boons to her worshippers, praised by Brahma, Vishnu and Siva, revealed on the 9th day of the dark half of Marg in the fathomless waters (of Nagavasa), be propitious to us. I adore *her*. (*Qy. it?*)

6. The Jal-surupa-Prajna of Nipal is here invoked, a portion of Prajna (the Sakti of Adi Buddha) in the form of water. This legend is a part of the foregoing, and is to be found in the Sambhu Puran. When Manja Nath had let off the waters, Jyoti-rup-Buddha was revealed: Manja resolved to raise a chaitya over the sacred flame, but when he essayed it, water bubbled up so strongly on the spot that he could not lay a single stone: perplexed, he resorted to prayer, when Guhyis-wari or Tal-rup-Prajna revealed herself for a moment; so immediately the water subsided, and Manja completed

the chaitya. I have translated "nairatmya" without form, and "agadhe" in fathomless *water*, in obedience to two comments, and to the opinion of a learned Buddha, to whom the words and meaning of these stanzas are as familiar as household terms.

7. May Ratna Singeswara, who was produced out of the union of a portion of Maitreya and of the light of the jewel of Manichura, who issued in the form of Srivatsa out of the riven rock on mount Manichur; whom the other seven Vitaragas reverence as their chief; and who is the raft by which the ocean of life may be crossed; be propitious to us all. I adore him.

7. In this and the seven following stanzas the eight Vitaragas of Nipal are invoked. Vitaraga is a portion of a Bodhisatwa, revealed under some non-human form.

In stanza 4, we have seen that there are nine famous Bodhisatwas. Of these the first, or Aryavalokeswara, never individuated a portion of himself, nor has he any manifestation but under a human form.

The individuated portions of the remaining Bodhisatwas are styled Vitaragas. Maitrêgás is the first, under the name of Manisingeswar, and form of a waving flame called Srivatsa. The forms of the remaining Vitaragas are severally, a lotus, a flag, a kalas, a chowry, a fish, an umbrella, and a conch. Some say that the singa is also a form common to all the Vitaragas, whilst others insist that singa here applied to them means merely sign-symbol. The symbols of the eight Vitaragas are often called collectively the "eight mangalas." Manichura was a Raja of Saketa Nagar or Ayodhya, in the crown of whose head grew an inestimable jewel, which he offered to the gods to avert their wrath in a general calamity. The legends of the Vitaragas are to be found in the Sambhu Puran. They are too long to be inserted here.

8. May that portion of the Bodhisatwa Gaganganja, which at the command of Padmapani assumed the form of a lotus, in order to relieve the cruel Raja Gokarna after he (the Raja) had, in atonement for his sins, become a penitent and worshipper of Padmapani on the banks of the Vachmati, and which, as Gokarneswara Vitaraga, still remains at the confluence of the Vachmati and Amoghvati for the purpose of delivering the ancestors of those who pay their devotions there, be propitious to us all. I adore *it*. (Qy. *him*?)

8. Invocation to the second Vitaraga under the name of Gokarneswara. Gokarna was a Raja of Pancha Des in the East of Hindoostan, says the comment.

9. May the mighty Vitaraga named Kileswara, who is a portion of Samanta Bhadra, and who took the form of a flag in order to frighten the furious serpent Kulika, when he secured it with the flag-staff on

the mountain of Charugiri for the preservation of mankind, be propitious to us all. I adore him.

10. May Sarveswara Vitaraga, who is the portion of the Bodhisatwa Vajra Pani, left on earth, in the form of a kalas, for the preservation of mankind by that Deity when himself descended for the purpose of relieving the Vajra Acharya named Sarva Pada, be propitious to us all. I adore him.

11. May Gattesa Vitaraga, the form assumed by Manja Deva for a portion of himself in order to awaken the ignorant and idle and sensual Manja Gartho, and convert him into a profoundly learned sage, be propitious to us all. I adore him.

12. May Phanindreswara Vitaraga, the form assumed for a portion of himself by Sarvani Varana Viskambhi Bodhisatwa, that Bodhisatwa desirous of the form of a fish, the wearer of huge serpents as ornaments, and who, having fulfilled the desires of Oriya Acharya, took the form of a fish, be propitious to us. I adore him.

12. The address here (as in the other instances) is chiefly, if not solely, to the Vitaraga: yet it is hardly possible to give unity to it: and the sense and grammar would be improved by putting a "may" before the words "that Bodhisatwa," and so making the address both to the Bodhisatwa and to his individuated portion.

13. As Oriyana covered by his umbrella was performing penance on the banks of the Vachmatí, the Bodhisatwa Prithwigarbha suddenly appeared, and established a portion of himself as Gandhesa Vitaraga, the friend of all, and standing in the presence of Lokanatha, may Gandhesa be propitious to us. I adore him.

14. Oriya, delighted at having obtained perfection by his severe ascetic exercises, began, whilst he contemplated the son of Amitabha, to blow the shell. At its sound Khagarbha Bodhisatwa became manifest; that Khagarbha whose heart is obedient to the will of Loknatha, and who having, in obedience to his will, issued from the conch and established a portion of himself as Vakrameswara Vitaraga, departed to his own abode. May Vikrameswara be propitious to us. I adore him.

14. The rendering of this stanza was a matter of some difficulty. Two or three comments were referred to, and the mention of Oriya reintroduced in obedience to the best of them, and to the living authority already alluded to. The "son of Amitabha, mentioned in this stanza is Padma Pani: and the Lokanatha, Avalokeswara, and Abjapani of preceding and succeeding stanzas are different names for the same Deity. He is considered the Lord and Master, in an especial manner, of the eight Vitaragas.

15. May the holy Tirtha Panya where the Saga obtained rest from Tarkshya : may the holy Tirtha Santa where Parvati performed penance to allay her domestic broils : may the holy Tirtha Sankaru where Rudra went through severe austerities to obtain Durga, be propitious to us all. I adore them.

15. In this and the subsequent stanzas the fourteen greater Tirthas of Nipal are particularized, and at stanza 20, the four lesser ones are mentioned generally.

They are all frequented at this day, and the legends are to be found in the Sambhu Puran. They are too prolix for extraction.

Panya tirtha is at Gokarna, where the Vachmati and Amagh-Phula-Dayini rivers unite.

Santa tirtha at Guhgeswari ghat, where the Maradarika joins the Vachmati.

Sankara tirtha immediately below the town of Patan, at the confluence of the Vachmati and Manimati.

16. May the holy Raja tirtha where Virupa obtained the sovereignty of the whole earth : may the holy Kama tirtha where the gamekeeper and the deer went to Indra's heaven : may the holy tirtha Mimalakhya, where the Vajra Acharya performed his ablutions, be propitious to us all. I adore them.

16. Raja tirtha at a place called in Newari, Dhantila, where the Raj-manjari runs into the Vachmati. It is just below the Sankara tirtha Kama tirtha called, in Newari, Phúsinkhel, at junction of the Kesavati and Vimlavati. The former is the river which the Goorkhas have taught us to call the Vishnumati, and so for Vachmati we say with them Vagmati. Besides those two, all the other rivers mentioned are mere mountain streamlets. Nirmala tirtha at a place called, in Newari, Biji Soko, junction of Kesavati and Bhadravati.

17. May the holy tirtha Akara, where treasure is obtained by the despairing poor : may the holy Juyana tirtha where the true wisdom is got by the ignorant solely by reverencing the stream : may the holy tirtha Chintamani, where every desire is attained by those duly performing their ablutions there, be propitious to us all. I adore them.

17. Akara tirtha at a spot called in Newari, Kahang, where the Kesavati and Suvarnavati join.

Jugana tirtha at Kadokhu at junction of Kesavati and Papanasini.

Chintamani tirtha at Pachilihvaivi where the Kesavati and Vachmati join. This is the great Sangam of Nipal, where its two chief rivers (they are but puny ones) unite below the present capital.

18. May Pramoda tirtha where ablution secures pleasure : may Satalakshana tirtha whose waters engender auspicious attributes : may

Sujaya tirtha, by bathing in the stream of which Balasura subdued the three worlds, be propitious to us all. I adore them.

18. Pramoda tirtha at Danaga (I need hardly repeat that these names of places are Newari,) junction of Vachmati and Ratnavati. Satlakshana tirtha at Pagakhucha, where the Vachmati and Charumati flow together. Jaya tirtha at Nakhupoa junction of Vachmati and Prabhavati.

19. May the Goddesses Vidyadhari, Akasyogini, Vajrayogini and Hariti: may Hanuman, Ganesa, Mahakala, and Chura Bhikshani: may Brahmani and the rest with Sinhini, Vyagrihini and Skanda be propitious to us all. I adore them.

19. The four first Deities are esoteric Goddesses of the Swobhavika sect. A comment says, "Above the region of air is fire, above fire water, above water earth, above earth Sumér mountain, above it Surya Mandal. In Surya Mandal is a lotus, out of which, by virtue of Swabhava, Vidyadhari and Akasyogini were revealed, each with her own Vija Mantra." The Swobhavikas usually symbolise these elements or vijas by the letters of the alphabet. The forms of these Goddesses are very much alike, all strictly resembling those of the terrific Goddesses of Brahmanism: and they are all said to be givers of the powers of witchcraft and sorcery to their adorers. The two first are said to be ranked by Amara Sinha with an inferior order of Celestials, and to such an order Hariti must be referred, since she is a Yakshini; but Vajrayogini is a Maha Devi or Goddess of the first order. Hariti's legend resembles that of Sitala, as whom Hariti is constantly worshipped by Brahmanical Hindoos, though her temple is within the very precincts of Sambhu Nath.

Hanuman, Ganesa and Mahakala are names sufficiently familiar to us. Amongst the Deities adopted by Buddhism from Brahmanism, these three are peculiar favourites, because the Bouddha legends justifying their adoption are popular and clever. The proper sentiment of the Saugatas in regard to all these imported Deities is, that they are servants of the Buddhas, and entitled only to "chakar-puja," as a specimen of the legends in virtue of which the gods of Brahmanism have been converted into Bouddha Deities take the following relative to Hanuman. In the Lankavata it is written that when Rama sent Hanuman to destroy Ravan, Ravan oppressed by the monkey, sought refuge from Sakya in a Vihar. Hanuman unable to violate the sanctuary, went to Rama and told him that he could no farther press his advantage against Ravan, because of Sakya's protection, whose follower Ravan had become. Rama replied 'Go you also and serve Sakya.' In all Sakya's Vihars are to be found the images of Hanuman, Ravan, Mahakala and Hariti. The Swobhavikas invoke Mahakala, under the name of Vajra Vira, as self-existent, whereas the Aishwarikas adopt him *with* his pedigree as the son of Siva and Parvati. Chara Bhikshani, is as her name imports, a female of the mendicant order of Bouddhas. Upon the interesting subject of the classification of their followers by the genuine Bouddha institutes I can only here observe, that though Buddhism is a free and equal association of ascetical saints who know no disparity of rank, save such as each may derive from his own

superior efforts of bodily mortification and mental abstraction, yet it has a technical fourfold division of its followers (very similar to that which distinguished the old Monachism of Europe) into Arhans or perfect saints, Sravakas or studious saints, Chailakas or naked saints, and Bhikshus or mendicant saints.

Brahmani and the Matrikas call for no remark. Sinhini and Vyagripini are their servants. The Aishwarika Skanda is in all respects similar to the Brahmanical Skanda : but the Swobhavikas (*more suo*) make him self-existent.

20. May the two great tirthas, the source and exit of the Vachmati : may the four lesser trithas : may the Kesa Chaitya on the Sankhochha hill, the Salita Chaitya on the Jatochha hill : may the Devi of Phullochha hill, and the Bhagavati of Dhyana prochha hill, be propitious to us all. I adore them.

20. The four lesser tirthas are named Tara tirtha, Agastya tirtha, Apsara tirtha, and Ananta tirtha. They are four kunds, situate at Vachdwara.

Saukhochha hill is that which the Goorkhas have taught us to call Sivapura. In Newari, it is Shiphucho. The legend of Kesa Chaitya says, that Krakut Chand Buddha cut off the forelocks (and so made Bouddhas) of 700 Brahmans and Kshetriyas on the spot. Half the hair rose to Heaven, and gave origin to the Kesavati (Vishnumati) river : the other half fell to the ground, whence arose numberless Chaityas in the form of Singas, a small mass of hair becoming in each the "palus" of the Lingakar Chaitya. Lalita Chaitya, says the Sambhu Puran, was founded by the disciples of Vipasya.

Jatachha hill on which it still stands, is the Arjun of the Goorkhas, called in Newari, Jamacho.

The Devi of Phullochha is Vasundhara, under the form of a conical piece of rock : the hill we call, after the Gorkhas, Phulchok. The Bhagavati of Dhyana Prochha is a portion of Gukyeswari or Prajna, under the form of a conical stone, the hill the Goorkhas have taught us to call Chandragiri.

21. May the Chaitya of Sri Manja on Sri Manja hill, erected by his disciples : may the five deities established in five separate places by Santasri : may the Puchagra Chaitya, where Sakya expounded the unequalled Purana, be propitious to us. I adore them.

21. Sri Manja Hill is the Western part of mount Sambhu, between which Sri Manja there is a hollow, but no separation. The Chaitya still stands.

The five Deities established by Sata Sri are Vasundhara Devi in Vasupur : Agni Deva in Agnipur : Vayu Deva in Vayupur : Naga Deva in Nagpur : and Gakya Devi in Santipur. All are on mount Sambhu around the great Temple. The legend in the Sambhu Puran says, that Santasri was a Kehstriya Raja of Gour Des, named Prachanda Deva, who abandoned his kingdom, and coming to Nipal was made a Bouddha by Gunakar Bhikshu, with the name of Santasri.

Pachagra Chitya is on the hollow level of mount Sambhu.

22. May the King of Serpents residing with his train in the Adhara lake: may Vighnantaka: may the five Lords of the three worlds named, Ananda Lokeswara, Harihari-hari-vahana lokeswara, Yakshamalla lokeswara, Amoghapasa lokeswara, and Trilokavasankara lokeswara, be propitious to us all. I adore them.

22. The legend is the same with that alluded to in stanzas 6, 7, and 24. The serpent King is named Karkotaka, his realm formerly extended all over the valley whilst it was submerged in water. Now he dwells in a tank near the town of Cathmandu assigned to him by Manja Nath, when Manja, let off the waters that covered Nipal. The Adhara lake or tank is called in Newari, Ta Dahong.

The five Lokeswaras are Bodhisatwas. Ananta is called in Newari, Chobha Deo, and Yaksha Malla, Tuyu Khwa.

23. May the esoteric deities named Hevajra, Samvara, Chandavira, Trilokivira, Yogambara, with their several attendants: may Yamantaka and the other nine Kings of wrath, be propitious to us: may the exoteric divinities Aparimitayu and the rest, Namsangiti and the rest, be propitious to us. I adore them.

23. The esoteric deities enumerated first, belong to the Swohhavika sect. Aparimitayu is in Buddha, and his associates as follows:—

- | | |
|-------------------------------|---------------------------------|
| 1. Aparimita Gūn, Buddha. | 5. Suryottama Prabhasa, Buddha. |
| 2. Guna Ratna Sri, ditto. | 6. Vahuvihita Teja, ditto. |
| 3. Aparimita Parti, ditto. | 7. Asaukheya Kalpa, ditto. |
| 4. Sahasreswara Megha, ditto. | 8. Subha Kanaka, ditto. |

Namsangiti is also a Buddha, and *his* associates as follows:—

- | | |
|----------------------------|-----------------------|
| 1. Dridha Surya, Buddha. | 3. Supuspita, Buddah. |
| 2. Bhaishajna Guru, ditto. | 4. Ratna Keta, ditto. |

24. May Manja Deva, who having come from mount Sirsha with his wives and two Devis divided the southern mountain with his scimitar, built the town of Manja Pattan for the pleasant abode of the human race, and worshipped the deity sitting on the lotus, be propitious to us all. I adore him.

24. The language, physiognomy, architecture, manners and customs of the Newars clearly prove their Northern extraction, and in the Samhhu Puran, a person called Manja Ghok is distinctly related to have led a colony into Nipal from China: for Sirsha Parvata is said to be situated in China, meaning probably Bhote. The making Manja a Dhyani or Celestial Bodhisatwa is a mere trick of modern superstition. The town of Manj Pattan founded by Manja has perished, but tradition still gives it a locality half way between mount Sambhu and the Paspati wood, and tradition is countenanced by the fact, that at this day quantities of building materials are often dug up on the assumed site of the town.

25. May Abjapani, the chief followed by Hayagriva, Jatadhari lokeswara, and the rest, who came from Sukhavati Bhavan, then proceeded to the mountain Putala, and being thence called by the Raja Deva Huta to remove accumulated evils, was established with many rites in Lalitapur, be propitious to us all. I adore him.

25. Hayagriva (said to be the same with Bhairava) Jatadhari and the rest reá Abjapanis (Padma Pani) warders and menials. The names of the rest are

- | | |
|--------------------|------------------|
| 1. Sudhana Kamara. | 6. Akalmritya. |
| 2. Ajita. | 7. Jaya. |
| 3. Aparajita. | 8. Vijaya. |
| 4. Marsainya. | 9. Abhaya Prada. |
| 5. Varada. | 10. Dhanada |

The Buddhmargy legend here alluded to is not supported by the authority of any of the Bouddha scriptures of Nipal, but rests on mere tradition. Abjapani is universally identified with Padma Pani, the fourth Dhyani Bodhisatwa. The application of the name and attributes of the Yogeswara Matsgendra Nath to this Deity is a corruption introduced by the Siva Margi Newars, and scouted by the Bouddhas in whose hands exclusively is the ministry of Abjapani's idol. The Bouddhas, however, have no objection to the Siva Margi Newars, and even Brahmanical Goorkhas making *offerings* to Padma Pani under any name they please, and in fact, all orders and sects unite in swelling the Yatra or procession of this Deity. The Bouddha tradition says, that upon the occurrence of a dreadful famine, Narendra Deva, a Raja of Bhatgong and Bandhudatta, a Vajra Acharya of Pattan, invited Padma Pani to Nipal. A quaint distich familiar to the learned Bouddhas fixed the date of Padma Pani's arrival at 1382 years from the present time. This subject is worthy of more attention than I have yet given it. By due pains (and they shall not be wanting) I hope to procure hereafter some written account of this event.

Notice of two Marmots inhabiting respectively the plains of Tibet and the Himalayan Slopes near to the Snows, and also of a Rhinolophus of the central region of Nepal. By B. H. HODGSON, Esq.

1. *Arctomys Himalayanus* of Catalogue. Potiús, *Tibetensis* hodie. Mihi. Structure typical. Tail not exceeding in length one-fourth of the body and head. Molars five-four, first above unicuspide and cylindrical in its body and tuberculous on the crown: the rest double, low, flat and rather hollow crowned, but with a slight heel on the inner extremity (towards the tongue,) and a groove between two transverse ridges towards the cheek. Pelage of two sorts; hair and wool: hair the more copious, straight, elastic, adpressed, rather harsh, an inch one-

eighth to one and a quarter long : wool wavy, a third less long, not found on the body below, or tail, or head, or limbs. Hair triannulate from the base, with dusky brown and yellow (of a canescent rather than rufescent cast) and black, the last ring much the shortest, and found only on the upper surface of the body : the woolly fur biannulate only, wanting the dark tips of the hairs. General external hue, a sub-rufescent cat-grey : beneath from chin to vent yellow : limbs and cheeks the same, but deeper toned and inclining to rufous : bridge of nose and last two inches of tail, dark brown. Twenty-two to twenty-four inches from snout to vent : tail with the hair, five and a half to six and a quarter. Palm and digits (exclusive of the nails) three and a quarter : Planta, ditto ditto, three and six-sixteenths. Sexes alike, and of nearly equal size.

Habitat Tibet. Social and gregarious.

2. *Arctomys Hemachalanus*, Mihi, Structure typical, but the digits furnished with a basal membrane. Tail exceeding a third of the length of the animal. Molars five-four, the first in upper jaw as in the last : the rest transverse and having their broad crowns sulcated round a horse-shoe ridge, in lower jaw cupped between four tubercles placed at the angles of each tooth. Pelage softer and fuller than in the above, of two sorts, or hair and wool, and nearly in equal quantities. Hairs straight, fine, elastic, and about one inch long : wool wavy and two-thirds only the length of the hair. Both hair and wool triannulate from the base with dusky, rufescent, and black, and nearly in equal proportions, the dark tips being ample wherever they exist, that is, on all the superior surface of the body and head, but not on the belly, nor limbs, nor sides of the head, nor ears ; general colour dark grey with a full rufous tinge which is rusty and almost ochereous red on the sides of the head, ears, and limbs, especially in summer. Bridge of nose and last inch of the tail dusky brown. Head and body above strongly mixed with black, which hue equals or exceeds the pale one on those parts. From snout to rump twelve to thirteen inches. Tail five and a quarter to five and a half. Palma, less than the nails, two and three-sixteenths. Planta, ditto ditto, two and fifteen-sixteenths. Sexes alike, and of nearly equal size.

Habitat the Himalaya with the Bhote pergannahs or Cachâr in the immediate vicinity of the snows. Social and gregarious.

Remarks.—I cannot doubt that the above two species are distinct, because the Trans-Himalayan animal is nearly twice as large as the Himalayan, and possesses a proportionately much shorter tail, not to dwell on the difference of habitat, which however seems to be invariable. In structure and in manners the two species, for the most part, correspond entirely, and the difference of colours is chiefly in intensity of hue.

Many years ago I possessed, alive, a specimen of the larger or Tibetan species of Marmot, which was as tame as a rabbit, and lived at large in the house. I have lost my notes on it, but recur to the fact, lest any one should tax me with multiplying species incautiously. I cannot now doubt, on full consideration, that the larger and lesser species are distinct; and I may add, that in my old specimen of the larger one, the crowns of the cheek teeth are nearly levelled by attrition. I have recently had two or three of the lesser species alive for months in my garden. The last lived above a year and quarter with me, when it died of an accidental wound. These individuals dwelt together in amity, were very somnolent by day, more active towards night and in warm weather, but did not fall into a permanent sleep in the cold season, perhaps because they were regularly exposed to the sun in the day time. They were fed on dry grains and on fruits, such as pears, pomegranates, and plantains. They slept rolled into a ball and buried in the straw, with which their case was amply supplied. Over their meals they would frequently chatter a good deal in a very audible tone, but were usually quite silent. They were very tame and gentle for the most part, but would sometimes bite and scratch like rabbits, uttering a somewhat similar cry. On foot they are by no means active, though more so than the *Rhizomys*. Nor are they very prone to digging, but will slowly excavate a subterranean abode for themselves if permitted. Their structure is plantigrade, but of the ambulatory, not fossorial or scansorial modification of that type; and, whilst their massive heads and jaws and powerful incisors indicate immense power in reaching, as well as masticating their food, their talons exhibit no development of the pre-eminent digging type. The following particulars of the external and internal organization of the lesser species will probably prove acceptable to the real students of Zoology. Head large, massive, conico-depressed, with eyes and ears equally and considerably remote

($1\frac{5}{8}$ inch). Culminal line of the head considerably arched along the nasal bridge, at the end of which the curve is lost in the prominence of the orbits, and subsequently in the fatness of all the cerebral part of the head, muzzle nude in front only, and not grooved. Upper lip not cleft, but full and incurved to the sides, so that the inside or palate is partially hairy. Lower lip very short and adpressed, nares short, ovoid, scarcely angulated or turned to the sides. Incisors very strong, white, rounded anteally, the upper pair directed nearly downwards, the lower pair forwards in a small crescented curve from the bases, where a large mass of gland is found on dissection, but no cheek pouch. Molars five-fourths, the first above unicuspid, and furnished with one tubercle on the subconic crown: the rest with broad transverse crowns, either cupped between four tubercles at the corners, or sunk within a horse-shoe ridge, the ends of which point to the cheek. Mustachios longish reaching to ears, not rigid, but very elastic. A similar but smaller tuft on each cheek, and above and before each eye, and others still smaller on the chin and behind the carpus, as well as before it or in front of the arm. Eyes medial, midway from snout to ear, pupil oblong. Ears small, erect, rounded, as broad at top almost as below, and very simple in structure, or devoid of all membranous processes. Helix inflected anteally, but not fissured posteally, and moderately clad, inside and out, as far down as the conch, the longest hairs forming a fringe along the upper margin, but *not* so that the ears can be called tufted. Body full, moderately elongated: limbs medial, plantigrade, ambulatory, of moderate subequal strength before and behind. Fore-arm about as long as the hand, including the wrist and nails. Palm wholly nude, soft, pretty full with two large subtrigonal basal or carpal pads, the inner of which supports and envelopes the rudimentary thumb, which has however its tip free and furnished with an andromorphous nail. There are three round terminodigital balls for the four fingers which are gradated as in man's hand, but have their bases connected by a distinct crescented membrane. Behind the digits are about as long and as stout as before, and are similarly connected by membrane, but the fifth digit or thumb is here fully developed and free, as long proportionately as in our hand, but rather feebler than the other digits, and having like them an anteal, not antagonistic position. The sole is nude to the heel, and about twice as long as the longest digit, soft and

smooth, with four proximate roundish balls for the bases of the five digits, and two small vague ones for the metatars placed subcentrally as to the entire length of the planta, and transversely in the same line. The tail without the hair is about half the length of the body without the head. It is not thick at the base, and thence gradually tapers, being rather fuller of hair than the body, and the hair exceeding the tail itself by about one inch, where it forms a blunt termination.

The anal and genital parts are void of any peculiar glands or pores. In the females the teats are twelve, and extend from the armpits to the back of the groins. In one specimen I find but ten mammæ: the larger species has twelve decidedly. The talons have the general character of those of our *Mesobema*, [olim *Urva*], being of medial subequal size, hardly larger before than behind, moderately compressed, rounded above, and scooped below towards their blunt extremities. The intestines in one specimen (female) measured ten feet and four inches: in another (male) eight feet and a half, and in the former the stomach along the greater arch was five inches and a half, and along the lesser two inches, while in the latter it was only four by one and a half. In the female, whose intestinal canal was ten-four, the cæcum was found at three-two from the anal, and was two inches long by one and a half in diameter, cylindric in shape and curved lunately as it lay in situ. The larger gut was one inch wide, and the lesser half that width. The stomach was purely membranous and (as flattened on a table) of an attenuate pyriform shape, having the upper orifice terminal, and the lower remote from it, but so as to leave a good sized fundus.

N. B.—There is a prior description of the large Marmot in the *Journal*, Vol. X, p. 777.*

* In Mr. Ogilby's 'Memoir on the Mammalogy of the Himalayas,' published in Dr. Royle's Volume on the Botanical productions of that immense range, we read that — 'Dr. Falconer, in the report of his recent journey to Cashmere and Little Tibet, mentions a rodent under the name of the Tibet Marmot, which he says was first found on a bleak and rocky tract of country, immediately after passing to the northern slope of the great Himalayan range; but we have no further knowledge of its characters: however, this is precisely the locality in which mammals of this description might naturally be expected to abound.'

It is not improbable that the *Lepus hispidus*, Pearson, described in the 'Bengal Sporting Magazine,' as quoted by Dr. McClelland in *Proc. Zool. Soc.* for 1839, p. 152, should also be referred to this genus: I hope to be soon able to procure specimens of it.—*Cur. As. Soc.*

3. *Rhinolophus Perniger*, Mihi. Structure typical. Inguinal teats, distinct large cup-shaped frontal sinus. Tongue considerably extensible, fleshy, full, smooth anteaally, subpapillate towards the gullet, nose-plate spreading amply to sides, and exceeding the edge of the upper lip, flat and free all round the margin, merely membranous, furnished with two salient processes, whereof the lower or anteaal one is like a door-knocker, and the upper or posteaal, a graduate spire. Ears very large, much longer than the head, shaped like a broad acutely pointed leaf, transversely striate, nude save at base, their fine points slightly drooped; the false or inner ear semicircular in form, and anteaally much attached to the cheek, so as to fold over the orifice of the auditory passage, where it doubles upon the anteaal part of the helix. Tail six-jointed, shorter than the body, and its full membrane squared nearly between the spread radii or metatarsal processes. Wings ample: thumb free and furnished with a nail: first finger one-jointed and no nail; the rest three-jointed and unarmed. Fur longish, very soft; lax and slightly curled. Colour uniform black, embrowned on the nude cutaneous parts, slighted tipped with silver on the back. Snout to rump three inches and a quarter (female,) tail two and one-eighth; head one and five-sixteenths, expanse seventeen; ears from anteaal base one and eleven-sixteenths, from the crown of the head or posteaal base one and six-sixteenths; fore arm two and five-eighth; second or longest finger four; leg or tarse one and three-eighth; foot from os calcis to end of talons thirteen-sixteenths.

Habitat, the central region of the Sub-Himalayas: shy: never approaches houses or the cultivated country: dwells in the deep forests and caves of the more precipitous mountains. [Mr. Hodgson has sent some other spieces of this genus, with descriptions; but as the Society expects shortly to receive from Europe M. Temminck's Monograph of the *Rhinolophi*, I deem it better to await the arrival of that treatise on the group, before venturing to determine Mr. Hodgson's and some other species of Horse-shoe Bats in the Museum.—*Cur. As. Soc.*]

Nepal, February, 1843.

B. H. HODGSON.

*Proceedings of the Asiatic Society.**Wednesday Evening, 3rd May, 1843.*

The Honourable W. W. BIRD, President, in the Chair.

Captain GOODWYN and Lieut. STRACHEY, of the Corps of Engineers, proposed at the last Meeting, were balloted for and duly elected Members of the Society.

Ordered.—That the usual communication of the election be made to Capt. GOODWYN and Lieut. STRACHEY, and that they be furnished with the rules of the Society for their guidance.

MESSRS. BRANDRETH and CUST C. S. were proposed as Members of the Society by the Honourable the President, seconded by Sir W. H. SETON.

Library.

The following Books were laid before the Meeting :—

Books received for the Meeting of the Asiatic Society, on the 3rd May, 1843.

The Oriental Christian Spectator. Bombay, April 1843. Second Series. Vol. iv, No. 4. Presented by the Editor.

Proceedings of the London Electrical Society, 1842-3, pts. 5th and 6th. Presented by the Society.

London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science. 3rd Series. December 1842. Vol. xxi, No. 140.

Annals and Magazine of Natural History. London, November 1842. Vol. x, No. 64.

Statistike Tabeller for Rongeriget Norge 1er till 5e. Reekke irreg. (Tableaux Statistiques sur la Norvège. Série 1er.-5e.) Presented by the University of Christiania.

Nyt Magazin for Naturvidenskaberne II Hefter (Nouveau Magazin pour les Sciences Naturelles, publié par la Société Physiographique á Christiania, 11 Cahiers). Presented by ditto ditto.

Lærebog i Mechaniken of Chr. Hansteen, 2 bande, (Cours complet de la Mécanique, par le Professeur C. Hansteen, 2 tomes). Presented by ditto ditto.

“Heimskringla” eller Snorre Sturlesons Norske Kongers Sagaer med 3de, Karter og fure Slaalsteb, (Chroniques des Anciens Rois de la Norvège, par Snorre Sturlesons, édits par T. Aall, avec Cartes et beaucoup de Planches). Presented by ditto ditto.

Abels Varker, 2 bande, (Œuvres complètes du Mathématicien Norvégien, N. H. Abel, redigeès par ordre du Roi, par le Professeur B. Holmboe). Presented by ditto ditto.

Descriptio Ornamentorum Aureorum et Nummorum in Norvegia Repertorum, 1825, scripsit C. Holmboe. Presented by ditto ditto, (2 copies).

De Nummis medii Aevi, in Norvegia nuper Repertis particula Posterior, 1837. Presented by ditto ditto.

Aarsberetning for det Kongelige Norske Frederiks Universitets for Aaret 1840, (Annuaire de l'Université, 1840). Presented by ditto ditto.

Norges Statistik af Schweigaard. 1st deel, (Statistique de la Norvège, par Schweigaard, tome 1er). Presented by ditto ditto.

De Mutationibus Virgæ Magneticæ, Auctore Christophoro Hansteen, 1842. Presented by ditto ditto.

Index Scholarum in Universitate Regia Fredericiana, 59 ejus Semestri, 1842. Presented by ditto ditto, (2 copies).

Gaea Norvegica, 1838, Earstex Heet. Presented by ditto ditto.

Universiteterne i Christianas. Upsala, 1836. Presented by ditto ditto.

De Prisca re Monetaria Norvegiæ, scripsit C. A. Holmboe, 1841. Presented by ditto ditto.

Indby Delsesskrift i Anledning of den Höitidelige Nedlæggelse of Grundstenen til Nye Bygninger for det Kongelige Norske Frederiks Universitet Tredivaarsdagen efter dets Stiftelse den 2den September, 1841. Presented by ditto ditto.

Read letter from Mr. Officiating Secretary DAVIDSON, No. 48, of 12th ultimo, communicating the acknowledgments of the Government for the offer, by the Society, of copies of a Sindee Vocabulary about to be published under its superintendence, and stating, that twenty-five copies of the work would be sufficient for the use of Government.

Read letter from Capt. H. M. DURAND, Private Secretary to the Right Honourable the Governor General of 8th ultimo, informing the Secretary that His Lordship would wish twenty-four copies of the Sindee Vocabulary to be sent to the Government of Bombay, the like number to the Secretary in the Political Department with the Governor General, and one copy to Major Leech, C. B.

Read letter from N. B. E. BAILLIE, Esq. of 24th ultimo, accepting the office of Member of Committee of Papers, and promising to render every assistance in his power to the best of his ability.

Read the following letter from Mr. R. S. MALING, of 2nd ultimo, presenting specimen of some Oil extracted from Nuts, the produce of trees called by the Natives Nipal Ukrote.

DEAR SIR,—I beg to forward herewith a small quantity of Oil extracted from Nuts the produce of trees called by the natives Nepal Ukrote, of which I have some few in my compound. I am unable to give you the real name of the tree, but in order that you may discover it, I send you, accompanying, some of its leaves and blossom, also some of the nuts it bears. The leaves so far as I can recollect, are precisely similar to those of the Sycamore, and the tree itself resembles it very much, so far so indeed as to lead me to suppose, (until I observed the nuts it bore,) that it was the Sycamore tree. From enquiries that I have made, I learn that the full grown trees I have were planted by Mr. Clerk of the Civil Service, some 28 or 30 years back; they flourish well here, and are of speedy growth. I planted some last rainy season, which are already

five and six feet high, the tree itself is ornamental, and to shew how profitable a plantation of them would be if cultivated for the sake of the oil, I annex the following:—

Say, 40 Trees upon each Beegah, .....	....	....	40
Each Tree averaging 1½ maund of oil,....	....	....	1½
			60
Such oil would fetch at the least even in Calcutta, 12 Rs. }			12
per maund. ....	....	....	}

Rs. 720 each Beegah,

from which must be deducted the cost of manufacture, which, however, would in all likelihood be paid for by any crop on the same ground, such as Indigo, Mustard, &c. &c. I extracted the oil sent you by pressure, in a manner exactly similar to that in use in the manufacture of cold drawn castor oil; the nut itself I have eaten, and found very palatable, far more so I think than the walnut, and I never experienced any bad effects from eating it. The natives say it is a purgative, but I did not find it so. At the present season the tree is particularly handsome, being covered with a handsome white blossom, which contrasts well with the large dark leaf of the tree. It is my intention to send some of the young plants I have to the Agricultural Society, and I shall have much pleasure in sending you as many young trees, and as much seed as you may require.

Yours very faithfully,

Baugundee, 2d April, 1843.

W. MALING.

P. S.—You will not fail to observe the remarkable difference between the leaves attached to the blossom, and those separate, and yet they are off the same tree.

Read the following Letter and Memorandum from Captain MACLEOD, of Moulmein, of 10th ultimo, on a specimen of Black Dye, of which samples were on the table:—

MY DEAR TORRENS,

The accompanying will speak for itself, the black colour conveyed by the Dye is the most beautiful I have seen. I would write more on the subject, but the letter and the Dye have just reached me, and I fear to delay, the Steamer being on the point of starting.

Yours very truly,

Moulmein, 10th April, 1843.

W. MACLEOD.

Zimmay, February, 1843.

“I have the pleasure of sending you a specimen of the Black Dye. I made the experiment myself, and find it is produced from the pulp growing round a kind of plum of a very light colour inside, until broke, exposed to the air and sun, when it gradually assumes the intense Black Dye, and becomes insoluble in water, and must go through the same process as Indigo, both being insoluble in water. The manner of dying silk is very simple; it is immersed in a quantity of the pulp mixed with water sufficiently thin, and either dipped or rolled over the silk which immediately being exposed to the sun grows darker, and if not sufficiently dyed, this is repeated; it requires but a small quantity to dye a quantity of silk.

I shall bring down with me a piece of Long Cloth I have had dyed; the process of dying cotton is different, it is first put in a solution of Indigo, dried, and then immersed and exposed to dry, becomes entirely black. The natives keep the Indigo in solution; with

it is mixed a great quantity of lime; no boiling or hot water is used in the process. Should you have an opportunity, send the specimen to the Society in Calcutta in my name, and I will bring a box down to be sent to England, as well as some Indigo; and enquire of them, if there is any premium for the production of a Black Dye that requires no sulphate of iron.

Read the following letter from Professor HOLMBOE, of the university of Christiana.

Christiana, le 21 Sept. 1842.

MESSIEURS.

Les Directeurs de la Société Asiatique de Calcutta.

Etant informé par mon compatriote Mr. Bonnevie, que Messieurs veulent bien vous mettre en rapport avec notre Université afin d'échanger des articles scientifiques, je prends la liberté d'envoyer ci-joints 215 monnoies, dont les 160 sont de la maison d'Oldenburgh, non plus en cours, et les 55 des monnoies du 12^{me} siècle récemment découvertes, sur lesquelles j'ai publié un mémoire, dont un exemplaire est aussi ci-joint.

Possédant déjà plusieurs des monnoies, que les Anglais ont fait frapper pour les Indes, il nous serait particulièrement agréable de recevoir des pièces frappées par les princes indigènes. Sur tout il nous intéresserait beaucoup de recevoir de celles, qui passent sous le nom de Indo-scythiques ou Indo-bactriques, et dont Messieurs Masson et Honigberger ont trouvé de grandes quantités dans l'Afghanistan.

Veillez agréer l'assurance de la parfaite considération, avec laquelle ja'i l'honneur d'être,

Messieurs,

Votre très humble et très obéissant serviteur,

F. HOLMBOE,

*Professeur des Langues Orientales à l'Université
Royale de Christiania, et Directeur de son Cabinet de Médailles.*

Read the following letters, giving cover to papers for publication in the Journal of the Asiatic Society; viz. of 21st April, from Mr. Officiating Secretary DAVIDSON, with a Report by Mr. Commissioner LUSHINGTON, on the results of the mining experiment conducted at "Pokhree in Gurhwal."

Of 15th April, from Capt. H. M. DURAND, with a brief History of Khelat, by Major LEECH, C. B., and a Journal of a Tour through parts of the Punjab and of Afghanistan, by Agha Abbas of Sheraz, arranged and translated by Major LEECH, C. B.

Of 11th April, from E. C. RAVENSHAW, Esq. C. S. with a memorandum on the construction of a "Portable Meridian," ordered to be published accordingly.

Read letter from Mr. JAMES REYNOLDS, Secretary of the Oriental Translation Fund, dated London, 14th February 1843, requesting remittance of the subscription of the Asiatic Society for 1842 and 1843, amounting to £21.

The remittance ordered to be made by a set of bills.

The Secretary presented to the Society sundry Fire Arms of the manufacture of Lahore, Cabool, and various places of Hindoostan, being as follows :—

Dokh, or Hindoostanee cut-and-thrust Sword.

Two Peshawur Firelocks, mounted after the Native and English fashions, lock made by Cashmeeree Gunsmiths of Loodiana to imitate Tower locks.

A Gun.

A Lahore Matchlock, purchased from one of Runjeet Singh's *Ghorchurras*.

Knife used by the tribes about the Khybur Pass, as Afreedees, Momunds, &c.

A small box, containing some dust of the Sandal-wood gates of Somnath was also presented, and examined by the Members. The impression was general, that the gates were really of Sandal-wood. A copy of the Inscription and the Report of the Committee of Engineer Officers had been sent with the box, but had been sent off for early insertion in the Journal without any copy being retained. The drawing of the gates had not yet reached the Secretary's hands. The subject was therefore ordered to be again brought to notice at the next Meeting.

Read the following Report from the Curator of the Museum of Economic Geology, for the month of April last :—

Report of the Curator Museum Economic Geology for the month of April.

Museum Economic Geology.—We have completed searching out and arranging our Indian Copper Ores, and the collection comprising 72 specimens from Kemaon, Gurhwal, Nepal, Shekawatee, Ajmere, Nellore, and Ramree is now upon the table. Much is yet wanting to complete this series, but we shall no doubt soon receive contributions. Mr. Commissioner Lushington's report on the Government experimental working of the Kemaon mines, which is presented this evening from Government, is a highly valuable record for future guidance, but we may remark upon it, that the outlay and the depth penetrated are trifling when compared with mining adventures in Europe, so that rich beds or veins may still remain to be reached by future adventurers in this locality.

Mr. Blundell, Commissioner, Tenasserim Provinces, has sent us an interesting paper, with specimens, being an analysis by Dr. Ure of London of the Magnetic Iron Ores and Limestones of Tavoy, which are upon the table. His letter is as follows :—

Moulmein, 7th April, 1843.

MY DEAR SIR,—Having last year sent home some specimens of the Iron Ores of these Provinces, I have lately received a chemical analysis of them by Dr. A. Ure, and thinking they might prove acceptable in the Museum of Economic Geology, I now beg to forward to your address, a box containing similar specimens.

Inclosed is a copy of the memorandum which accompanied the specimens I sent to England, and of Dr. Ure's report on them.

The box is on board the Honorable Company's Steamer *Hooghly*, and will be delivered to you by Captain Ross.

Yours truly,

G. H. BLUNDELL.

From Captain Newbold, M. N. I. Assistant Commissioner of Kurnoul, we have to acknowledge a specimen of a remarkable barren soil from that part of Southern India, the label to which best describes it.

Jairi Soil from Kurnoul, infertile, very impervious to water, used for flat roofs of native houses in Kurnoul as a protection against rains.

I have not yet been able to examine this soil, but it is remarkably like one from Cheduba brought by Captain Halsted, also quite infertile, and is probably like it, rendered so by being almost a pulverulent Iron Ore, rather than a soil.

Geological and Mineralogical.—We have received from the University of Christiana, in addition to several valuable works noticed in the Librarian's report, a small but valuable series of Fossils and Geological and Mineralogical Specimens, in all 50 in number, which are on the table. Of these, the Fossil and Geological Specimens are entirely new to our collection, but some few of the Mineralogical ones we already possessed. It is to the exertions of Captain Bonnevie of Tirhoot, a member of that University, that the Society is indebted for this very handsome donation, which it will be our duty to return in the best manner we can, and by the earliest opportunity. Captain Bonnevie's letter is as follows:—

To the Secretary of the Asiatic Society, Calcutta.

SIR,—It is about nine months since, at the suggestion of Mr. Blyth, I wrote to the University of Christiana in Norway, proposing an interchange of natural productions and scientific works between that body and the Asiatic Society. I have now the honor to enclose a letter, with accompanying lists of articles sent by the University, and beg to inform you, that the packages shall be forwarded to the Society immediately on their arrival.

I have been requested to inform the Society, that in the list of minerals, the "Æcmite" Crystal, No. 35, is now very scarce, as the spot where it is found is becoming exhausted, and also, that the specimen of "Gadolinite" No. 44 is of great value. It is a very rare production, and mostly found in small pieces mixed with other substances.

The University would feel very gratified to receive in return any minerals or rare fossils peculiar to Asia, and if procurable, Casts in Gypsum of the cranium of the Sivathorium and other fossil animals of the like kind that have been discovered in this country.

In the lists of books, you will observe a work styled "De Mutationibus Virgæ Magneticæ," by Professor Hansteen. I have been requested by him to suggest to scientific men in India, to make as many observations as possible on the dip and the variation of the Needle. As the suggestion of a learned and influential body like the Asiatic Society will have weight, when those of a humble individual like myself would be deemed presumptuous; perhaps the Society will be kind enough to assist the Professor by urging these observations on its numerous scientific members scattered over India.

I have the honor to be, Sir,

Your most obedient servant,

C. S. BONNEVIE.

RUNGPORE,

The 19th February, 1843.

Mr. Frith has kindly sent us a curious specimen of Wood reduced to brown Coal and Lignite, which was taken from a well now digging at Dum-Dum by his father.

H. PIDDINGTON,

Curator, Museum Economy Geology.

For all the Presentations, the thanks of the Society were accorded.

NOTICE.

A mistaken impression having gone abroad respecting the high rate of subscription said to be required from Members of the Asiatic Society of Bengal, the Committee of Papers desire specially to note that the total subscription entitling a Member to all the usual privileges as hereinafter noted, is *sixty-four rupees a year, or five rupees five annas a month.*

Rules of the Asiatic Society.

The following is an abstract of the Rules of this Institution which are now in force, including those printed in the Appendix to the sixth and subsequent Volumes of the Society's Transactions.

Original Rules adopted from the Founder's Discourse 15th February, 1784.

1.—The Institution shall be denominated the Asiatic Society, the bounds of its investigations will be the Geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by man or produced by nature.

2.—Weekly meetings shall be held for the purpose of hearing Original Papers read on such subjects as fall within the circle of the Society's enquiries.

3.—All curious and learned men shall be invited to send their Tracts to the Secretary, for which they shall immediately receive the thanks of the Society.

4.—The Society's Researches shall be published Annually, if a sufficiency of valuable materials be received.

5.—Mere Translations of considerable length shall not be admitted except of such unpublished Essays or Treatises as may be transmitted to the Society by Native Authors.

6.—All questions shall be decided on a Ballot, by a majority of two-thirds, and nine Members shall be required to constitute a Board for such decisions.

7.—No new member shall be admitted who has not expressed a voluntary desire to become so, and in that case no other qualification shall be required than a love of knowledge, and a zeal for the promotion of it.

Subsequent Resolutions of the Society which are in force.

8.—The future meetings of the Society shall be held on the first Wednesday of each alternate month, viz. in the months of February, April, June, August, October, and December, at nine o'clock in the Evening.

9.—If any business should occur to require intermediate meetings they may be convened by the President, who may also, when necessary, appoint any other day of the week, instead of Wednesday for the stated meetings of the Society.

10.—As it may not always be convenient for the President, to attend the meetings of the Society, a certain Number of Vice Presidents shall be elected annually.

11.—In case the President and the Vice Presidents are absent at any meeting, a quarter of an hour after the fixed time, the Senior Member present shall take the chair for the Evening.

12.—Every Member of the Society shall have the privilege of introducing as a Visitor, any Gentleman, who is not usually resident in Calcutta.

13.—With a view to provide Funds for the necessary expences of the Society, an admission Fee shall be established to consist of Two Gold Mohurs, payable by every member on his Election; and each member of the Society resident in India (Honorary Members excepted) shall also contribute a Gold Mohur quarterly in the first week of January, April, July, and October, any member neglecting to pay his Subscription for half a year, after it becomes due, to be considered as no longer a Member of the Society.

14.—All Members returning to India, shall be called upon to pay their Subscription as usual from the date of their return.

15.—A Treasurer shall be appointed.

16.—In addition to the Secretary, an Assistant Secretary, and a Librarian shall also be appointed.

17.—A Committee of Papers shall be appointed, to consist of the President, Vice Presidents, Secretary, and nine other Members to be elected annually, and any number no less than five shall be competent to form a Committee.

18.—This Committee will select from the Papers communicated to the Society such as may appear proper for publication, and superintend the Printing of the Society's Transactions.

19.—The Committee of Papers shall be authorized to draw upon the Treasurer for any sums requisite to defray the expense of publishing the Transactions, and an order signed by a majority of the Committee, will be a sufficient warrant to the Treasurer for paying the same.

20.—The Committee of Papers is authorized to defray any small contingent expenses on account of the Society, which they may deem indispensable.

21.—Every Subscribing Member of the Society, on application shall be furnished with a Copy of such Volumes of the Researches as may be published whilst he continues a Member in return for his contributions, without any further payment.

22.—With a view to the more general circulation of the Asiatic Researches in India, the price of the 12th and future Volumes to Non-Subscribers, shall be fixed at a Gold Mohur, and if several Volumes of different years be purchased together they shall be sold at 10 Rupees each.

23.—The Agents of the Society in England shall be desired to purchase, and forward for the Society's Library, Books of Science and Oriental Literature published in Europe, taking care that those purchases at no time exceed the Funds arising from the sale of the Society's publications.

24.—The Committee of Papers shall be requested to furnish the Agents in Europe with such further instructions as may appear requisite for their guidance in the selection of Books proper to be placed in the Library of the Society.

Library.

25.—The Library is open from 10 to 4 o'clock, between which hours the Native Librarian is to be in attendance every day, Sunday excepted.

26.—None but the members of the Society are allowed to borrow Books from the Society's Library and no Book is to be lent out of Calcutta, without especial permission from the Committee of Papers.

27.—Books are to be borrowed by written or personal application to the Secretary; in either case the person applying is to furnish a written receipt specifying the name of the Work, and the time for which it is borrowed, at the expiration of which, he is to return the Book borrowed, or renew his application for an extended loan of it.

28.—The receipts for the Books shall be filed and a record kept of the Books lent out to whom and when lent out, and when returned.

29.—A list of the Books in the library, and a Register of those lent out, are to be kept ready for inspection.

30.—All persons borrowing Books, are to be answerable for their safe return, or are expected to replace them if injured or lost.

Museum.

31.—On the 2nd February 1814, the Society determined upon forming a Museum for the reception of all articles that may tend to illustrate Oriental manners and History, or to elucidate the particulars of nature or art in the East. The following Resolutions were at the same time passed upon the subject.

32.—That this intention be made known to the Public, and that contributions be solicited of the undermentioned nature.

1. Inscriptions on Stone and Brass.
2. Ancient monuments, Mahomedan or Hindoo.
3. Figures of the Hindoo Deities.
4. Ancient Coins.
5. Ancient Manuscripts.
6. Instruments of war peculiar to the East.
7. Instruments of Music.
8. The vessels employed in Religious Ceremonies.
9. Implements of Native Art and Manufacture, &c. &c.
10. Animals peculiar to India, dried or preserved.
11. Skeletons or particular bones of Animals peculiar to India.
12. Birds peculiar to India stuffed or preserved.
13. Dried Plants, Fruits, &c.
14. Mineral or Vegetable Preparations in Eastern Pharmacy.
15. Ores of Metals.
16. Native Alloys of Metal.
17. Minerals of every description, &c. &c. &c.,

33.—That the Hall on the ground floor of the Society's House be fitted up for the reception of the articles that may be procured. The Plan and expenses of so doing to be regulated by the Committee of Papers and Secretary, and the person under whose superintendence the Museum may be placed.

34.—That the expense which may be incurred in preparing materials furnished in a state unfit for preservation be defrayed by the Society within a certain and fixed extent.

35.—All articles presented to the Museum shall be delivered in the first instance to the Superintendent of the Museum, to enable him to make the acknowledgement directed in the standing rules of the Society.

36.—A Register of Donations to the Museum, shall be exhibited at each Meeting of the Society.

37.—The Committee of Papers shall adopt such means as may appear proper for making the intentions of the Society, in this respect, generally known.

38.—That the names of persons contributing to the Museum or Library of the Society, be hereafter published, at the end of each Volume of the Asiatic Researches.

Bibliotheca Asiatica.

The following Resolutions were passed on the recommendation of the Committee of Papers, under date the 2nd July 1806, but materials have not yet been received for publishing a Volume of the work therein proposed.

39.—That the Society publish from time to time as their Funds will admit of it, Volumes distinct from the Asiatic Researches, translations of short works in the Sanscrit and other Asiatic Languages, or Extracts and descriptive accounts of Books of greater length in those Languages, which may be offered to the Society, and appear deserving of publication.

40.—That as this publication may be expected gradually to extend to all Asiatic Books of which copies may be deposited in the Library of the Society, and even to all works extant in the learned Languages of Asia, the Series of the Volumes, be entitled *Bibliotheca Asiatica*, or a Descriptive Catalogue of Asiatic Books with Extracts and Translations.

Physical Class.

The following Resolutions were passed on the 2nd January 1828.

- 1.—That the Physical Committee of the Asiatic Society be considered as in existence, and for the same purposes as formerly, exclusively of medicine.
- 2.—That all Members of the Society, be Members of the Committee.
- 3.—That persons not belonging to the Society, may be elected as corresponding Members of the Committee, upon the recommendation of any three Members without being liable to any charge.
- 4.—That the Committee elect its own Officers.
- 5.—That the Committee frame its own rules, subject whenever likely to interfere with the rules of the Society, to confirmation at a General Meeting.
- 6.—That the Proceedings of the Society and short notices of any interest be published from time to time as they accumulate in such form as may be hereafter found convenient.
- 7.—That Papers of any extent or permanent interest be published in the same type and form as the Researches, so as to admit of their being bound up with them.
- 8.—That the expence of these publications be borne by the Society.
- 9.—That the Physical department of the Museum be considered under the especial charge of the Committee, Mr. Tytler undertaking the care of the Osteological Specimens, and Mr. Ross of the Minerals.

Translation Committee, 3rd September 1828.

That a Committee of the Society be formed to communicate with the Committee of Translations of the Royal Asiatic Society and carry their views into effect, by procuring and transmitting such Manuscripts, Originals and Translations as they may be able to obtain for the purpose.

That a Book be opened for Subscriptions of ten Guineas per annum, each Subscriber entitling him a copy of all the Works printed by Translation Committee.



For use in Library only

